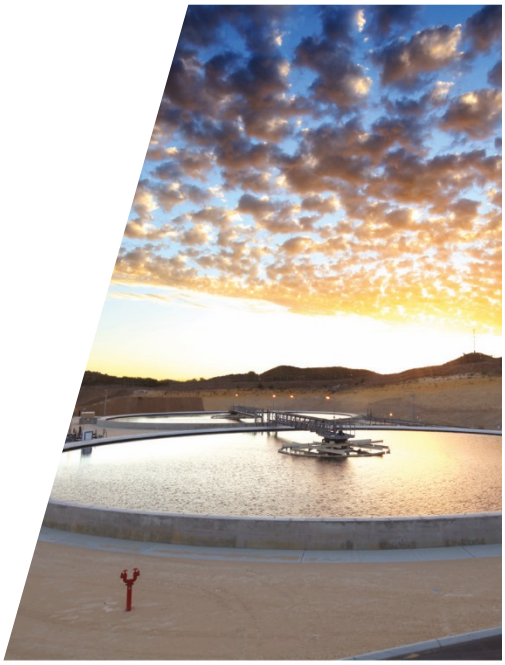
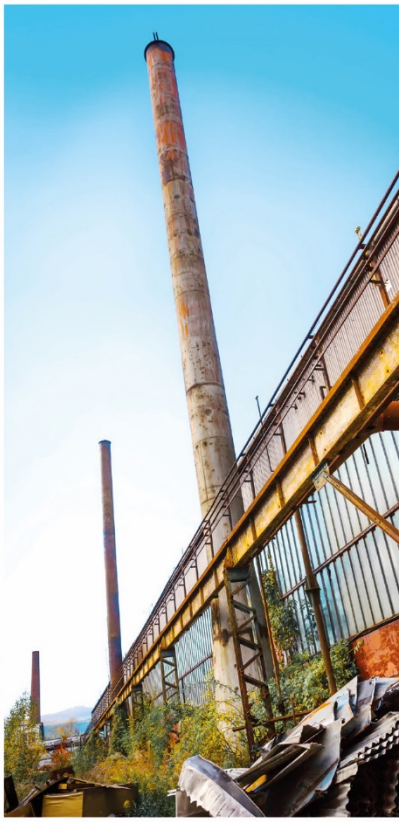


July 2019 Semi-Annual Groundwater Monitoring Report

Star Laundry Inc. (aka FabraCare)
204 Camellia Boulevard
Fort Valley, Peach County, Georgia

Star Laundry Inc.



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1. Introduction

This July 2019 Semi-Annual Groundwater Monitoring Report was prepared by GHD for the Star Laundry Inc. (aka FabraCare) property at 204 Camellia Boulevard in Fort Valley, Peach County, Georgia (Site). GHD conducted this second 2019 semi-annual groundwater monitoring event from July 7th through July 10th, 2019. This sampling event also serves as the second post-injection monitoring for the November 2018 injection event that was conducted at the Site. The work performed is consistent with the Scope of Work approved by the US Environmental Protection Agency (EPA) by letter dated February 15, 2001 and subsequent modifications approved on February 22, 2006. The Site location is presented on Figure 1. The groundwater monitoring well locations are presented on Figure 2.

2. Site Overview

2.1 Site Overview

The Site is within the central Fort Valley (Peach County) business district, which is centered around Main Street. Impacts to groundwater and soil detected beneath the Site are consistent with the prior operation of a dry cleaning facility at the Site. However, the claim originally made by the Georgia Environmental Protection Division (EPD), that releases of dry cleaning solutions from the Site are responsible for the detections of volatile organic compounds (VOCs) in two City of Fort Valley water supply wells (subsequently replaced by FabraCare), presumes the existence of a potential migration pathway to both of those wells from the Site as well as the actual migration of contaminants along such pathway(s). This migration would have to take place through three saturated zones with intervening clay aquitards, and then flow upgradient for over 700 feet. This presumption further ignores the presence of numerous other likely sources of contamination within the Fort Valley business district as discussed in the document submitted to the EPA by GHD during March 2017.

Groundwater within the upper 100 feet at the Site is found in two zones: a shallow perched zone found at the sand/kaolin clay contact and an unconfined permeable zone within the sand and silt, below the kaolin layer. The perched zone groundwater contains tetrachloroethene (PCE) and its biodegradation products trichloroethene (TCE) and cis-1,2-dichloroethene (cis-1,2-DCE), as well as an isolated past occurrence of 1,4 dioxane, which is not likely related to the former dry cleaning operation and has not been detected in recent sampling events over the EPA Maximum Contaminant Levels (MCLs). 1,4-dioxane sampling was discontinued following the July 2018 sampling event. The EPA has requested 1,4-dioxane be sampled by Method 522 with a detection limit of 0.3 µg/L in order to be compared to drinking water MCLs. Since this constituent is not known to be linked to dry cleaning operations, but could be linked to the former automotive repair shop located upgradient of the Site and the perched groundwater being sampled is not being used for drinking water, but rather the wells that are used for drinking water have been replaced at a considerable cost, the group has not agreed to conduct this sampling.

2.2 Summary of Investigations and Remedial Activities

The overall approach to investigations and remedial activities for the Site was described in the original Characterization Work Plan (CWP), which was submitted in November 1999. EPA approved the 1999 CWP by letter dated February 15, 2001. Following implementation of the initial scope of work, a Site Characterization Report - Phase I (Phase I SCR) was submitted to EPA on October 15, 2001. During the Phase I SCR investigations, a soil vapor extraction (SVE) system was installed on the northern portion of the Site and tested on a pilot scale basis. The SVE began full-scale operation in January 2002.

Initially, a dual phase extraction system (soil vapor and groundwater) was proposed to address contamination observed above the kaolin layer beneath the Site. However, due to the limited depth of saturation of the shallow groundwater zone (Perched Zone) above the kaolin, the first phase of the remediation that has been performed at the Site was based on an SVE system. The initial SVE system consisted of five recovery wells located in the rear (northwest) portion of the property.

Conestoga-Rovers & Associates (CRA; now GHD) installed three recovery wells (RW-1, RW-2 and RW-3) at the Site in May 2001. The wells were installed across the northwest portion of the Site. To improve coverage of the rear parking lot for the operational SVE system, two additional wells (RW-4 and RW-5) were installed in November 2001. Details and boring logs and well construction details were provided in Appendix A of the Phase I SCR.

EPA provided comments on the Phase I SCR by letter dated January 24, 2002. Representatives of EPA and CRA met on March 28, 2002, and on May 23, 2003, to review the comments. Further discussions led to EPA's request, in a letter dated January 10, 2004, for the submittal of a formal plan for additional investigations, followed by resubmittal of a Site Characterization Report. The Phase II CWP was prepared in March 2004. A proposed modification to the interim remedy being performed at the Site was submitted to EPA by letter dated June 17, 2005. In this letter, CRA proposed implementation of an in situ chemical injection program in lieu of expanding the SVE system. The Phase II CWP and remedy modification was conditionally approved[1] by EPA in their letter dated February 22, 2006.

The operation of the SVE system was successful in extracting PCE from subsurface soil and to a lesser extent groundwater. As of November 2004, the SVE system had removed an estimated 665 pounds of PCE from the subsurface. Contaminant removal had stabilized at a low rate suggesting that the system had substantially removed the available contaminant within the radius of influence of the extraction wells. Although the SVE reduced the contaminant mass and appeared to hinder further migration of contaminants in groundwater, the system reached steady state after its effectiveness diminished and before it reached remediation goals. Cycling of the system showed a marginal improvement but would not result in a significant reduction of the residual on-Site contamination. Operation of the SVE system was discontinued and a pilot test for the alternate remedy (enhanced bioremediation using sodium lactate injection) was performed in April 2006.

Sodium lactate was injected in a total of 16 points through direct push technology (DPT) rods in a grid pattern around the perimeter of the Site between April 17 and 20, 2006. It was anticipated that each injection point would have an effective treatment radius of 25 feet. Within each boring,

[1] Conditional approval required implementation of the Phase II CWP immediately upon receipt of the approval letter and submittal of a task schedule.

approximately 250 gallons of the reductant solution were injected at two intervals: 27 to 28 feet below ground surface (bgs) (several feet above the kaolin layer in the perched groundwater zone) and 21 to 23 feet bgs. After the injection was complete, each boring was sealed with neat cement or bentonite. In addition to lactate, potassium permanganate was injected at one location at the front (south end) of the Site in the vicinity of EPD monitoring well EPD-5B.

Groundwater monitoring events were conducted in July 2006, October 2006, and March 2007 to assess the effectiveness of the April 2006 injection event. The results showed that enhanced bioremediation by lactate injection had a strong potential to remediate the dry cleaning constituents (PCE and degradation products) observed at the Site. A decrease in the concentrations of PCE with a corresponding increase in degradation parameters (several orders of magnitude in several wells) was observed in the first quarterly sampling event (July 2006). Though not as dramatic as noted in the July 2006 sampling event, the samples collected during the second (October 2006) and third (March 2007) quarterly sampling events demonstrated a general trend of decreasing PCE concentrations with corresponding increases in degradation products (TCE and cis-1,2-DCE). Dissolved oxygen (DO) and oxidation-reduction potential (ORP) generally decreased in the samples collected in October 2006 and March 2007. These decreases provided additional evidence of the effectiveness of the degradation of PCE as a result of the lactate injection completed in April 2006.

In 2012, CRA's Innovative Technology Group (ITG) reviewed the pilot study report, the previously submitted Work Plan (titled Supplemental Injection of Reductant Scope of Work), and monitoring data and provided a comparison of various remedial technologies and recommendations for the treatment of the residual PCE and degradation products in the groundwater. CRA's ITG recommended additional In situ Enhanced Biodegradation (ISEB) using emulsified vegetable oil (EVO), instead of the sodium lactate used in the pilot study. EVO was injected into the subsurface during September 2013 and April 2016.

During the July 2015 monitoring event, it was noted that monitoring wells EPD-5A and EPD-5B appeared to have been destroyed by construction activities and PZ-2 was not found. It was later proposed that the shallow wells (EPD-5A and PZ-2) be replaced. Those replacement monitoring wells were installed on February 16, 2016, identified as MW-5R and PZ-2R, to approximately 29 feet bgs and 31 feet bgs, respectively, constructed with 10 feet of 1-inch PVC screen. The locations of the Site monitoring wells are shown on Figure 2.

Following evaluation of these remediation activities, injection of Peroxychem EHC® Liquid in situ chemical reduction (ISCR) reagent (EHC-L) was recommend by GHD to the EPA and in a work plan dated June 14, 2018, which was approved by the EPA by email dated June 27, 2018. These injection activities were conducted from November 12th through 15th and November 29th and 30th, 2018 under a Class V Underground Injection Control Permit issued by the Georgia EPD on October 2, 2018 (Permit No. GAW000719). Figure 3 illustrates the locations of the EHC-L injection points to date.

The first post-injection monitoring event since the injection of EHC-L took place at the Site in January 2019. The July 2019 sampling event represents the second post-injection monitoring event for this injection.

2.3 Summary of Recent Remedial Activities

2.3.1 2013 Injection Activities

During September 2013, CRA provided oversight of EVO injection activities using DPT at the Site. A concentration of approximately 10% EVO solution was injected at each of the 10 injection locations. Approximately 300 gallons were injected at each location. Flow rates were between 3 and 9 gallons per minute (gpm) and injection depths ranged from 20 to 27 feet bgs.

2.3.2 Injection Monitoring

Baseline groundwater monitoring was conducted on May 13 and 14, 2013; samples were analyzed for VOCs. The May 2013 groundwater sampling event was conducted to collect baseline data prior to the remedial injections. The details of the May 2013 sampling event were previously submitted to the EPA in the June 2013 Progress Report.

Initial post-injection monitoring was conducted on February 19 and 20, 2014, approximately 5 months after initial injection of EVO. Each well was sampled for VOCs, dissolved ethane, ethene, and methane, total and dissolved iron and manganese, ammonia-nitrogen, orthophosphate-phosphorus, nitrate, sulfate, and sulfide to monitor the remedial effectiveness. A discussion of the groundwater analytical results was provided in the Memo entitled *Remedial Injections and Groundwater Sampling Events – May 2013 to February 2014*, dated April 23, 2014.

The January 2015 groundwater sampling event was conducted sixteen months after the September 2013 injection to further monitor the remedial effectiveness of the injections. CRA's ITG reviewed the data from the January 2015 sampling event and provided a discussion in the memo entitled *Review of Monitoring Data after the September 2013 EVO Injection*, dated March 24, 2015. Upon review of the data, CRA's ITG indicated that the level of treatment of PCE and TCE was positive at this point, but further monitoring would be required to confirm the overall and on-going effectiveness of the treatment. Semi-annual groundwater monitoring of VOCs and remedial effectiveness parameters was recommended for July 2015, six months after the January 2015 sampling event.

GHD conducted groundwater sampling in July 2015, 22 months after the September 2013 injection activities. The July 2015 PCE and TCE concentrations decreased from the May 2013 baseline values in several wells (MW-1, RW-1, RW-2, RW-3, and RW-4). PCE and TCE concentrations remained consistent or showed increases in MW-3, MW-11B, RW-5, and PZ-1 when compared to the May 2013 baseline results. The July 2015 data suggested that the EVO that was injected in September 2013 was becoming depleted. It appeared that biodegradation slowed in the areas of wells RW-2 and RW-5 leading to increases in VOC concentrations and the VOC concentrations at some wells remained above the MCLs; therefore, a second EVO injection event was conducted during April 2016.

2.3.3 2016 EVO Injection

On April 13 through 15, 2016, GHD contracted Atlas-Geo Sampling to perform the injection of EVO at 14 on-Site DPT locations. The injection points were off-set from the September 2013 locations to deliver more of the amendment to the areas of wells MW-2 and MW-3. Each DPT location received a mixture of 285 gallons of water, 35 gallons of EVO, 40 pounds of sodium bicarbonate, 3 pounds of ammonium sulfate, 0.3 pounds of sodium phosphate, and 6.5 pounds of Accelerite divided between two depth intervals (between 21 and 23 feet bgs and between 27 and 28 feet bgs) at each location. The approximate locations of the injection points are shown on Figure 3.

Post-injection groundwater sampling was conducted in July 2016, January and July 2017 and January and July 2018. Evaluations conducted by GHD's ITG of the remedial effectiveness of the April 2016 injection activities and post-injection groundwater sampling was included as an attachment to the January and July 2017 and January 2018 Semi Annual Groundwater Monitoring Reports for the Site. These memos indicated the January and July 2017 data suggested that the April 2016 injections had altered conditions at the Site and stimulated further biodegradation, but full dispersal of the EVO had not yet occurred due to low water levels. Since the data indicated that the injected material was still present at the Site and was dispersing slowly due to the low groundwater levels, additional injections of EVO were not deemed necessary at that time. During 2017, water levels increased. This increase seemed to have resulted in dispersal and consumption of the EVO noted during the 2018 post-injection groundwater monitoring event. January 2018 post-injection monitoring data indicated EVO had been consumed and some rebound in chemicals of concern (COC) concentrations had occurred.

Evaluation of injection chemical options and preparation of an injection work plan and permit application for the next proposed injection event began immediately. The In Situ Chemical Injection Work Plan was submitted to the EPA on June 14, 2018 and approved on June 27, 2018. The Class V Underground Injection Control Permit Application was submitted to the Georgia EPD on July 27, 2018. The Georgia EPD issued the permit on October 2, 2018.

2.3.4 2018 EHC-L Injection

To address observed rebounds and continue remediation progress at the Site additional injection activities utilizing Peroxychem EHC-L were conducted November 12th through 15th, and November 29th and 30th, 2018. Approximately 400 gallons of EHC-L solution was introduced by a direct push technology (DPT) drill rig into each of 16 injection points at the Site as shown on Figure 3. These locations were chosen based on recommendations made in the July 2018 Semi-Annual Groundwater Monitoring Report dated September 2018. Each location received approximately 180 pounds of EHC-L (ELS concentrate) and 9.6 pounds of EHC liquid mix in 375 gallons of water, injected over a nominal vertical interval from approximately 2 feet below water table to approximately 10 feet below water table where possible followed by injection of approximately 20 gallons of chase water. Due to the tight clays in the subsurface at the Site, the injection rates were approximately 2 gpm at injection pressures ranging from 20 to 110 pounds per square inch (psi).

With effective treatment appearing to have been achieved in the shallow zone in the interior of the Site with the exception of some residual cis-1,2-DCE, monitoring wells such as MW-1, MW-2, MW-3 and RW-5, which are located toward the edges of the Site and had not received as much treatment during past events, were targeted.

2.4 EPA Correspondence

A timeline of historical Site events is included in Appendix A and documents recent EPA correspondence. EPA issued a comments letter for the January 2019 Semi-annual Groundwater Monitoring Report on June 18, 2019. GHD responded to the comment letter in a correspondence to EPA on July 31, 2019. Bi-monthly progress reports are submitted to the EPA to document all Site activities. The most recent bi-monthly progress report was submitted to EPA on August 15, 2019.

3. Current Remedial and Monitoring Activities

3.1 Groundwater Monitoring Activities

From July 8th through 10th, 2019, GHD gauged and attempted to sample ten on-Site groundwater monitoring and recovery wells (MW-1, MW-2, MW-3, MW-5R, MW-11B, RW-1, RW-2, RW-3, RW-4, and RW-5), two off-site piezometer wells (PZ-1 and PZ-2R), and six off-site Georgia EPD wells (EPD-1a, EPD-1b, EPD-2a, EPD-2b, EPD-3a and EPD-3b). Well locations MW-5R and EPD-2a did not contain a sufficient amount of water to collect a sample. Groundwater gauging and monitoring activities were conducted in general accordance with the U.S. EPA Field Branches Quality System and Technical Procedures (FBQSTP) Science and Ecosystem Support Division (SESD) for Groundwater Level and Well Depth Measurement (SESDPROC-105-R2) and FBQSTP SESD for Groundwater Sampling (SESDPROC-301-R3), respectively.

The depth to groundwater in each monitoring well was measured prior to purging and sampling. The wells were purged either under low-flow conditions using a peristaltic pump fitted with ¼"–OD polyethylene tubing or with a dedicated disposable polyethylene bailer. For the deeper zone monitoring wells sampled (MW-11B, EPD-1b, EPD-2b and EPD-3b), a bladder pump was utilized to establish low-flow purging or to remove three volumes of water if low flow conditions were unable to be established prior to sampling. Only one of the wells, MW-11B could not be purged with the bladder pump because historically it has created significant drawdown for low flow conditions to be established for sampling; therefore, a dedicated disposable bailer was utilized.

For the monitoring wells subjected to low-flow purging, field parameters (i.e. temperature, conductivity, turbidity, DO, pH, and ORP) were measured in the flow-through cell of a calibrated, multi-parameter water quality meter. Purging was complete after three consecutive readings of each parameter were within acceptable limits. Monitoring wells MW-2, MW-3, MW-11B, PZ-1, PZ-2R, and EPD-1a were purged of 3 volumes or dry prior to stabilization and were sampled upon partial recharge. No water was purged from MW-3 or PZ-1 prior to sample collection due to the very low water column height and known slow recharge rate. Well purging records and field parameter data are included in Appendix B.

Each on-Site well and PZ-2R with sufficient amount of water was sampled for VOCs, methane, ethane, ethene, total and dissolved iron and manganese, ammonia-nitrogen, orthophosphate-phosphorus, nitrate, sulfate, sulfite and total organic carbon (TOC). Wells MW-2 and MW-3 were only sampled for VOCs due to low amounts of water and/or recharge in the wells. Each off-Site well with a sufficient amount of water was sampled for VOCs. In order to evaluate injection chemical residence time, on-Site wells RW-1 through RW-5, MW-1, and MW-11B along with off-Site well PZ-2R were sampled for metabolic acids as well. The Georgia EPD wells, located off Site, were only

sampled for VOCs since they are of too great a distance for use in evaluating monitored natural attenuation parameters and on-Site conditions.

All groundwater samples from the July 2019 event were preserved on ice in a cooler and submitted to Pace Analytical Services, Inc. (Pace) in Peachtree Corners, Georgia, under standard chain of custody protocols. One blind duplicate groundwater sample was collected from monitoring well EPD-2b (GW-014918-070819-DJB-102) and analyzed for VOCs only and one matrix spike/matrix spike duplicate (MS/MSD) sample was collected from monitoring well EPD-3b for VOCs only (GW-014918-070919-DJB-105) and submitted to Pace for an internal quality assurance/quality control (QA/QC) assessment. The validated July 2019 groundwater analytical results are summarized in Table 1 and shown on Figure 4 (Site wells) and Figure 5 (off-Site wells). A data validation memorandum for the samples submitted to Pace, the field sample key and the laboratory analytical reports for all samples are included in Appendix C. The historical groundwater analytical results summary is included in Table 2.

Groundwater elevation gauging data were used to compile groundwater elevation contour maps for the shallow and deeper zone aquifers. These are included as Figure 6 and Figure 7, respectively. Groundwater elevation gauging data are summarized in Table 3.

4. Groundwater Analytical Results and Discussion

4.1 Site Wells and PZ-1 and PZ-2R

The July 2019 event is the second post-injection performance monitoring event since the November 2018 EHC-L injection. In February 2016, a groundwater monitoring event was conducted to establish pre-injection, baseline conditions prior to the April 2016 EVO injection and future injections. The July 2016 event was conducted as the first post-injection performance monitoring event. In comparison to the baseline sampling event, the July 2016 data showed several improvements in concentrations across the Site. Significant reductions in PCE concentrations were observed initially in MW-1, MW-3, RW-1, RW-3 and RW-4. TCE concentrations were reduced to below the MCL in RW-3 and RW-4 and PCE concentrations were reduced to below the MCL in RW-4 also. Over time a rebound in PCE concentrations was observed in MW-1 and RW-5 and in TCE concentrations in MW-1 and MW-2. PCE and TCE concentrations remained relatively stable, but exhibited a general downward trend in RW-1, RW-2 and RW-3.

In comparison to the January 2017 event, the July 2017 event showed decreases in the concentrations of PCE and TCE in monitoring well RW-1, while some continued rebound in PCE and TCE was observed in monitoring well MW-1.

Data from the January 2018 event showed some additional rebound in PCE in MW-1 and RW-2, while PCE decreased in MW-2, MW-3, MW-11B and RW-5. PCE concentrations were noted as relatively stable in RW-1 and non-detections continued in RW-3 and RW-4. An increase in TCE was not noted in any monitoring well sampled during the January 2018 event, while decreases were noted in MW-3, MW-11B, PZ-1 and PZ-2R. MW-1 and RW-2. Concentrations of cis-1,2-DCE increased during the January 2018 monitoring event in MW-1 MW-2, MW-3, RW-2, RW-3, RW-4 and RW-5. A decrease in cis-1,2-DCE was only noted in MW-11B. Concentrations of PCE, TCE and cis-1,2-DCE all remained stable or decreased during the July 2018 sampling event with the

exception of MW-1, RW-1 and RW-3, which showed increases in cis-1,2, DCA, a sign that biodegradation was still occurring.

The January 2019 was the initial sampling event following the November 2018 injection of EHC L. Analytical data from this event indicated reductions in overall chlorinated VOC (CVOC) concentrations in the areas of wells MW-1, MW-2, MW-3, RW-1, RW-2, RW-3, RW-4, RW-5, and possibly PZ-1. Rebounds observed prior to the November 2018 injection appeared to have been reversed in most wells. Some increased concentrations of daughter products cis-1,2-DCE and vinyl chloride were observed.

Review and comparison of the historical analytical data and the analytical data from the July 2019 sampling event indicates that a general trend of decreasing CVOC concentrations continues to occur on the Site, particularly within the injection areas. Monitoring and recovery wells MW-1, RW-1, RW-2, and RW-5 displayed decreases in PCE and TCE while showing increases in cis-1,2-DCE and/or vinyl chloride, which follows the general trend observed since the beginning of the injection program.

For wells MW-1, RW-1, RW-2, RW-3, and RW-4, both PCE and TCE have been reduced to below the MCL for the past two monitoring events, with both constituents dropping below MCLs in RW-5 during the July 2019 event. Breakdown past the cis-1,2-DCE stage appears to be occurring in a limited capacity in some of the recovery wells based on decreasing cis-1,2-DCE concentrations and/or increasing vinyl chloride concentrations. Ethene concentrations were elevated above laboratory detection limits in RW-2 and RW-3 during the July 2019 event, which suggests that complete degradation of the chlorinated ethenes is occurring in these locations.

Due to degradation of the cis-1,2-DCE in the groundwater, vinyl chloride concentrations in RW-2, RW-4, and RW-5 exceeded the MCL for that constituent during the July 2019 sampling event.

PCE concentrations in wells PZ-1 and PZ-2R remain elevated above the MCL; however, a decreasing trend appears to be occurring for this constituent since July 2017, following the initial injections. Breakdown product concentrations have not been observed to be rising in conjunction with the PCE reductions.

Metabolic acids were significantly reduced in wells that displayed elevated concentrations during the January 2019 monitoring event. Specifically, MW-1, MW-11B, RW-2, and RW-5 each exhibited a sharp reduction in the amount of metabolic acids in the groundwater between the January 2019 and July 2019 sampling events. With the exception of WM-11B, each of these wells displayed elevated methane concentrations and sharp reductions in iron concentrations. This reduction suggests that the EHC-L substrate injected during the previous round of may have been consumed and that the anaerobic reducing environment established through the injection may be trending toward the less reductive pre-injection conditions.

Monitoring wells MW-2 and MW-3 have historically contained detectable concentrations of PCE and/or its degradation compounds; however, none of these compounds were reported above laboratory detection limits for the samples collected in July 2019 at these two wells. These wells are located on Site in the vicinity of injection points and have displayed decreasing trends in concentrations of VOCs during past sampling events; however, both wells were dry or exhibited limited recharge during sampling, so there is a potential that the sampling data for these wells is not representative of groundwater conditions. Groundwater samples for these wells will continue to be

collected and evaluated in the future in order to determine if the analytical results from this event are outliers.

Additional groundwater samples were collected from wells RW-2, RW-3, RW-4, and MW-11B and submitted for quantitative polymerase chain reaction (QPCR) analyses to identify the presence of and quantify, if present, the Dehalococcoides (DHC) bacteria in these wells. The presence of DHC in groundwater provides a biological pathway for dechlorination of PCE to ethene. No DHC organisms were found in any of the wells during the July 2019 sampling event. The laboratory analytical report for the DHC analysis is included in Appendix C.

An evaluation memo detailing the review of groundwater monitoring data as it relates to the November 2018 EHC-L injection event, prior injection events, and subsequent groundwater monitoring is included in Appendix D.

4.2 Georgia EPD Wells

Off-Site shallow zone monitoring wells EPD-1a, EPD-2a and EPD-3a and deeper zone monitoring wells EPD-1b, EPD-2b and EPD-3b were installed by Georgia EPD and have been sampled by GHD semi-annually as part of the groundwater monitoring program since January 2018. Prior sampling of these wells has been performed by others since as early as March 1998. All EPD wells were analyzed for VOCs only due to their distance from the Site. The Georgia EPD wells are paired with one shallow zone well and one deep zone well at each well set location. EPD-1a and EPD-1b are located approximately 475 feet crossgradient in the shallow aquifer and downgradient in the deeper aquifer in relation to the Site. EPD-2a and EPD-2b are located approximately 200 feet upgradient in the shallow aquifer and downgradient in the deeper aquifer in relation to the Site. EPD-3a and EPD-3b are located approximately 150 feet crossgradient in the shallow aquifer and upgradient in the deeper aquifer in relation to the Site.

Analytical results from the July 2019 monitoring event continue to indicate non-detections for all VOCs in shallow zone wells, EPD-1a, EPD-2a and EPD-3a.

VOC concentrations remain above the MCLs for PCE in each of the deeper zone wells, with TCE identified above MCLs in EPD-1b and EPD-2b, both of which are located downgradient in relation to the Site within this aquifer layer. While CVOCs remain elevated above MCLs in these wells, the concentrations in EPD-2b, the closer of the two downgradient off-Site deep wells, remain significantly reduced when compared to 2006 data and earlier analytical results. In general CVOC concentrations in EDP-1b have remained consistent with historical data. The PCE concentration increased in EPD-3b in comparison to the January 2019 event and remains above the MCL; however, the concentration detected remains lower than data collected prior to 2006.

5. Soil Vapor Intrusion Modeling Results and Discussion

5.1 Johnson and Ettinger Model Calculations

The EPA Johnson and Ettinger (J&E) model (EPA, 2017) was used to model the movement of soil vapor through the three primary soil layers that comprise the vadose zone, i.e., above the Perched groundwater. These three soil layers were selected as follows:

- Clay Loam soil type from surface to approximately 15 ft bg (4.57 m bg) (Stratum A thickness of 4.57 m)
- Loam soil type from 15 ft bg to 22 ft bg (4.57 m bg to 6.7 m bg) (Stratum B thickness of 2.13 m)
- Sand soil type from 22 ft bg to 24.72 ft bg (6.7 m bg to 7.53 m bg) (Stratum C thickness of varied depending on the depth to groundwater at the monitoring well location – see Table 4 for thickness used

The majority of the boring logs had clay from 15 to 22 ft bg, however to be conservative in the modeling the shallowest depth of 15 ft bg was used for the first layer as noted above.

The depth below grade to the water table was selected based on the water levels measured during the groundwater sampling event in July 2019, the depth to water table used for each monitoring well locations is presented in Table 4. The temperature of the groundwater was based on the measured groundwater temperature during the July 2019 sampling event within the monitoring well. The dimensions of the existing slab-on-grade commercial building (approximately 30 ft by 60 ft) (or 548.64 square meters) were also used. The detected or estimated groundwater concentrations of cis-1,2-DCE, PCE, TCE and vinyl chloride within each monitoring well measured during the July 2019 sampling event were used within the J&E model to calculate the risk and hazards. The risk and hazards are shown in Table 4 by monitoring well location.

As shown in Table 4 the cancer risk and hazard quotient (HQ) estimates are below or within the EPA's acceptable cancer risk and HQ ranges.

Monitoring wells MW-2 and MW-3 have historically contained detectable concentrations of PCE and/or its degradation compounds; however, none of these compounds were reported above laboratory detection limits for the samples collected in July 2019 at these two wells. Therefore, no vapor modeling was performed for these two points based on the July 2019 data. These wells are located on Site in the vicinity of injection points and have displayed decreasing trends in concentrations of VOCs during past sampling events. Both wells were dry or exhibited limited recharge during sampling, so there is a potential that the sampling data for these wells is not representative of groundwater. Consideration of vapor concerns for these wells will continue for future sampling events in order to determine if the vapor risk is no longer present or if the sampling data during this event is an outlier.

Calculations for each of the monitoring wells used in this evaluation are included in Appendix E. EPA, 2017, which utilizes the Johnson and Ettinger Model Spreadsheet Tool, Version 6.0 (XLS) from https://www.epa.gov/vaporintrusion/epa-spreadsheet-modeling-subsurface-vapor-intrusion#version (downloaded April 4, 2019).

6. Summary of Remedial Monitoring Results

Post-injection data from groundwater sampling events conducted in 2016, 2017, 2018 and 2019 show overall favorable results when compared to the February 2016 pre-injection data. The July 2017 analytical data indicated that EVO had been fully dispersed and largely consumed at all monitoring locations due to increased water levels. The January 2018 data indicated EVO has been consumed as evident by TOC data and additional rebounds noted, potentially indicating slowed biodegradation. Nevertheless, the July 2018 data indicated decreases in VOCs with the exception of increases in cis-1,2-DCE in three of the on-Site monitoring wells, which indicates biodegradation was still occurring at the Site in these areas. Data continued to show that Site conditions had been altered, dispersion of the material had occurred, biodegradation had been stimulated and anaerobic conditions had been established at the Site.

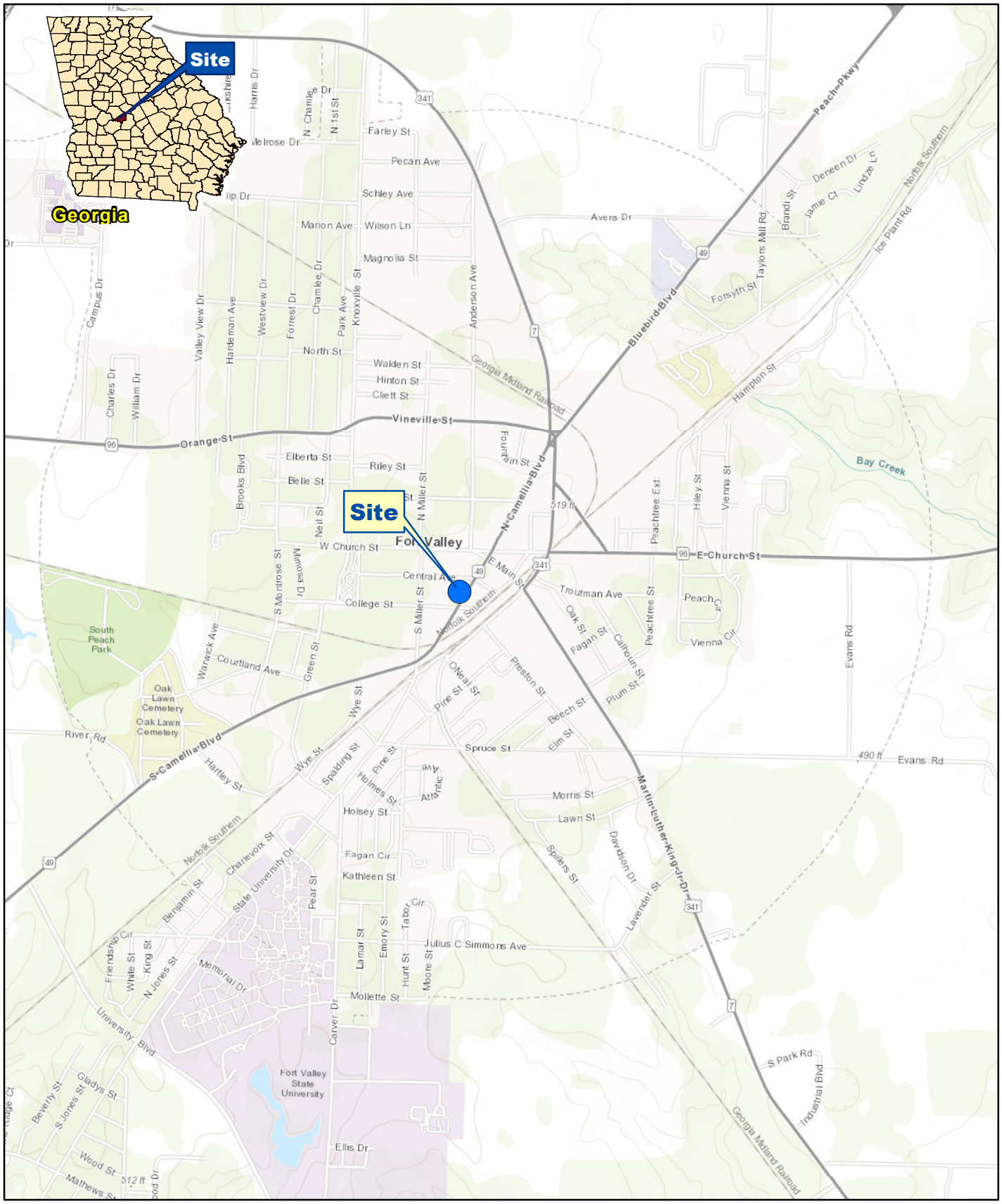
The data from the July 2019 sampling event suggests that the EHC-L reagent has dispersed throughout most of the Site and has enhanced anaerobic conditions and stimulated the biodegradation of CVOCs. PCE and TCE are no longer present within the treatment area at the Site and only daughter products cis-1,2-DCE and vinyl chloride remain above MCLs. The only wells not immediately impacted by the injections are wells PZ-1 and PZ-2R, which are located off Site and outside of the injection area; however, the data suggest that some of the injected material may now be making contact with these wells. The increased dispersal observed after the November 2018 injection event compared with the April 2016 injection event may be partly due to the more aqueous nature of EHC-L injected in 2018 compared to the EVO injected in 2016 but is likely largely due to the higher water levels present at the Site in 2018 compared with 2016.

Degradation appears to be proceeding, though TOC concentrations have decreased in most wells. Although increased reductions in CVOC concentrations, particularly in concentrations of daughter products, are expected to continue in the short term, an additional injection may be required in order to continue remedial progress.

The absence of DHC bacteria in the sampled Site wells suggests that degradation may stall. In most of the wells, cis-1,2-DCE and low levels of vinyl chloride are the only CVOC remaining, and based on the microbial data these compounds may be slow to degrade. The presence of ethene observed in select wells during the January and July 2019 events suggest that complete dechlorination was occurring at the Site; however, it is possible that this reduction was a result of abiotic dechlorination mediated by iron present in the EHC-L. Bioaugmentation may be considered as part of the next injection event; however, the next injection event should not occur until groundwater levels have increased.

As shown through the EPA J&E modeling results derived from the July 2019 groundwater sampling data, cancer risk and HQ estimates are below or within the EPA's acceptable cancer risk and HQ ranges for the Site.

Figures



Source: ESRI World Topographic Maps.

0 1,000 2,000

Feet

Coordinate System:
NAD 1983 UTM Zone 17N

N

GHD

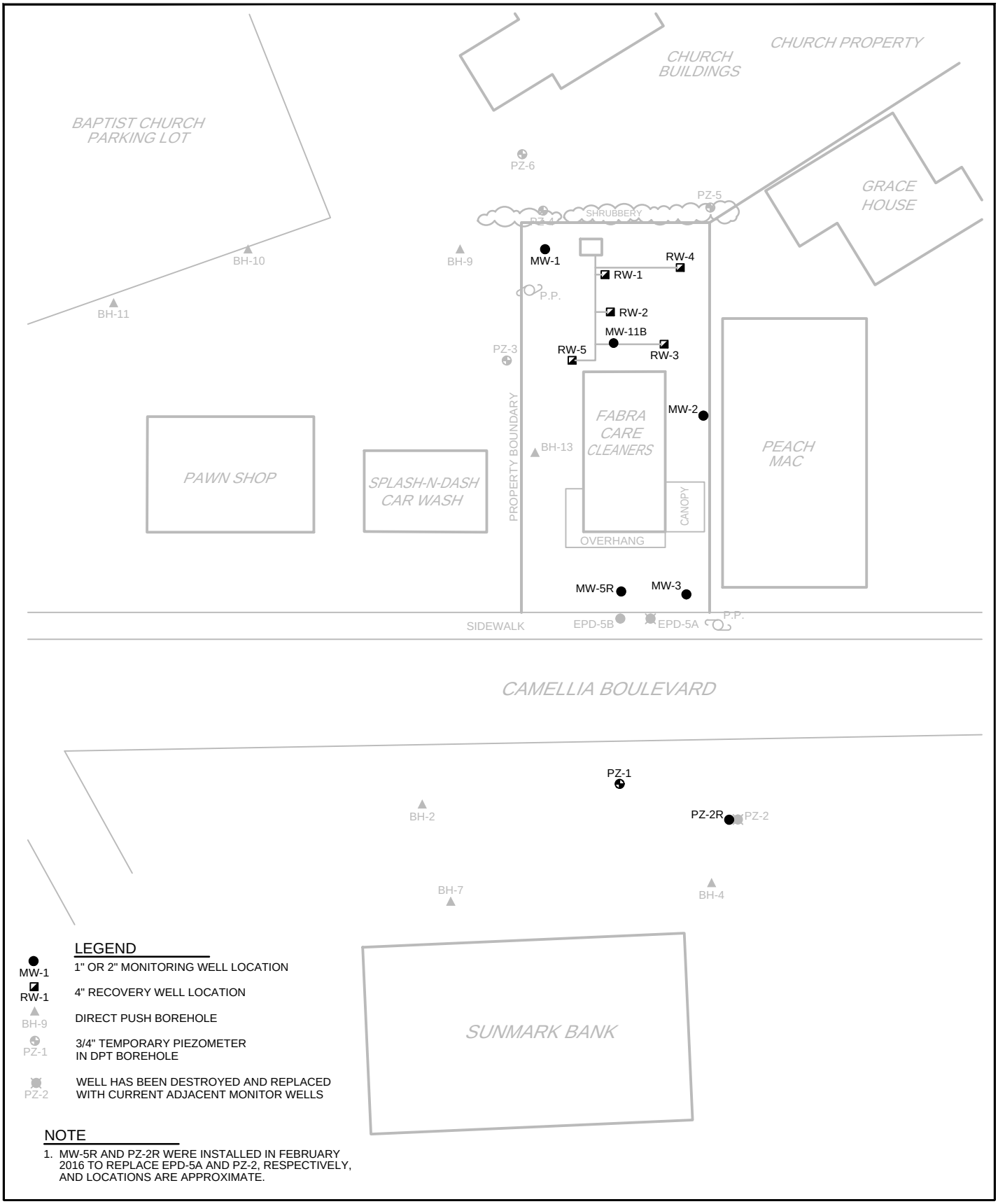
FABRACARE CLEANERS
FORT VALLEY, GEORGIA

Sep 11, 2019

SITE LOCATION MAP

FIGURE 1

GIS File: I:\GIS\GIS\Projects\14000S\14918\Layouts\022\014918-00(022)GIS-BR001.mxd



0 20 50ft

FABRACARE CLEANERS
FORT VALLEY, GA

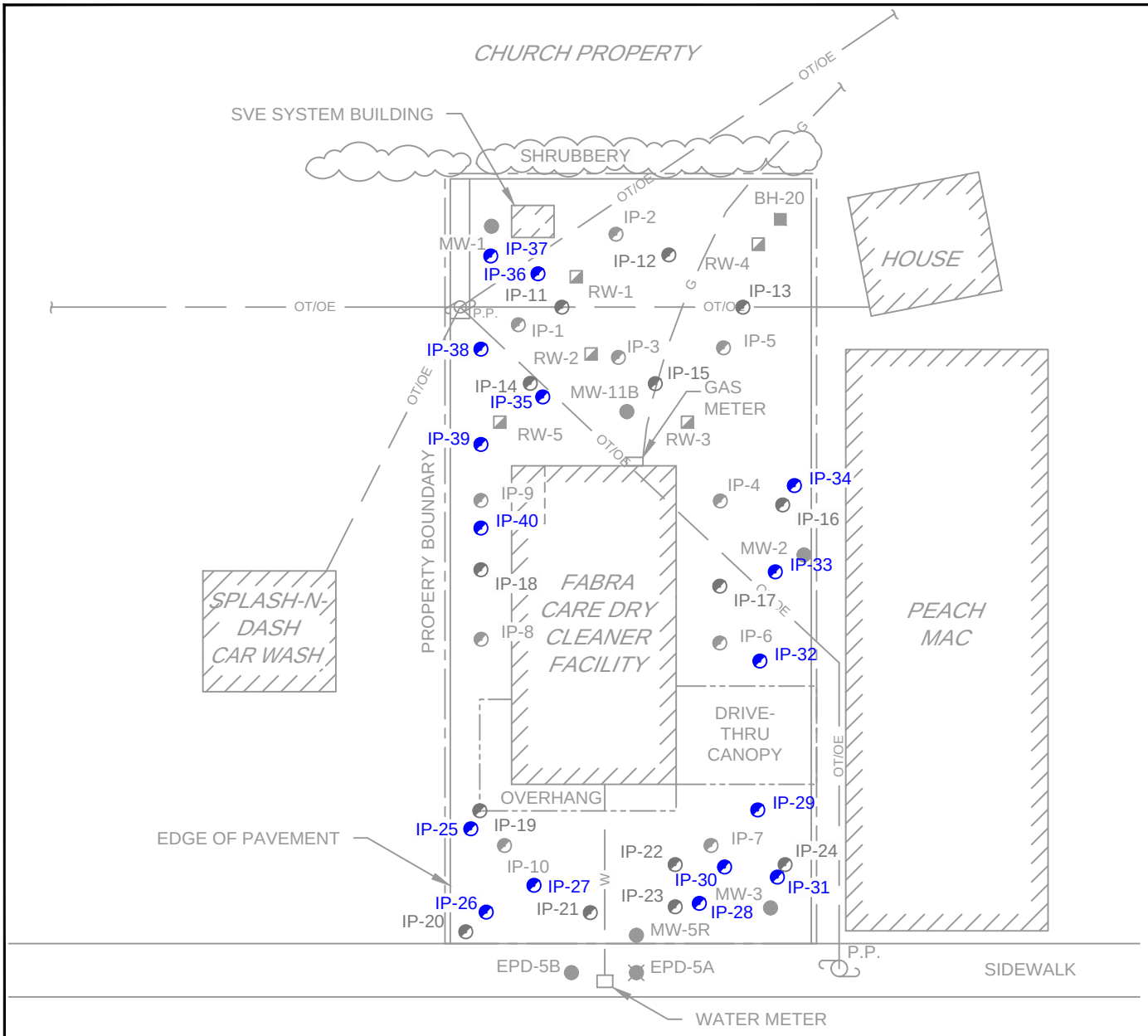
14918-00

Sep 12, 2019

SITE LAYOUT MAP

FIGURE 2

CAD File: N:\CA\St Catharines\Legacy\DRAWINGS\14000s\14918\14918-REPORTS\14918-00(022)\14918-00(022)GN\14918-00(022)GN-SC001.DWG



LEGEND

G	APPROXIMATE LOCATION OF NATURAL GAS LINE
	OVERHEAD UTILITY (POWER AND COMMUNICATION)
W	APPROXIMATE LOCATION OF UNDERGROUND WATER LINE
MW-1	1" OR 2" MONITORING WELL LOCATION AND IDENTIFIER
RW-1	4" RECOVERY WELL LOCATION AND IDENTIFIER
BH-20	SOIL BORING LOCATION
P.P.	POWER/UTILITY POLE
IP-1 - IP-10	APPROXIMATE INJECTION LOCATION (SEPT 2013)
IP-11 - IP24	APPROXIMATE EVO INJECTION LOCATION (APRIL 2016)
IP-25 - IP-40	APPROXIMATE EHC-L INJECTION LOCATION (NOVEMBER 2018)
EPD-5A	MONITORING WELL DESTROYED

NOTE:
1. MW-5R AND PZ-2R WERE INSTALLED IN FEBRUARY 2016 TO REPLACE EPD-5A AND PZ-2, RESPECTIVELY, AND LOCATIONS ARE APPROXIMATE.

0 10 30ft

FABRA CARE CLEANERS
FORT VALLEY, GEORGIA

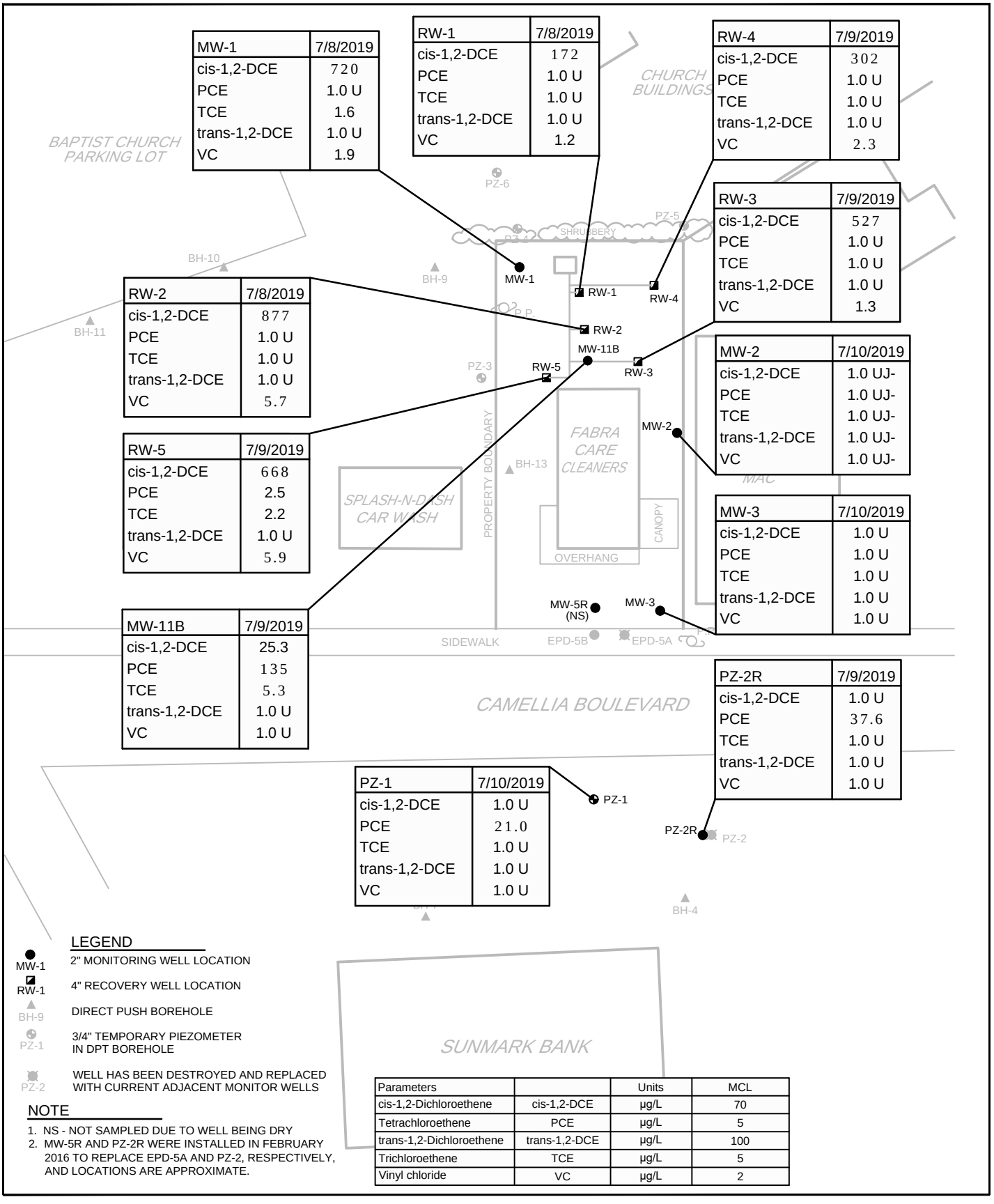
EVO INJECTION POINT LOCATION MAP

14918-00

Sep 12, 2019

FIGURE 3

CAD File: N:\CA\St Catharines\Legacy\DRAWINGS\14000s\14918\14918-REPORTS\14918-00(022)\14918-00(022)GN\14918-00(022)GN-SC002.DWG



0 20 50ft

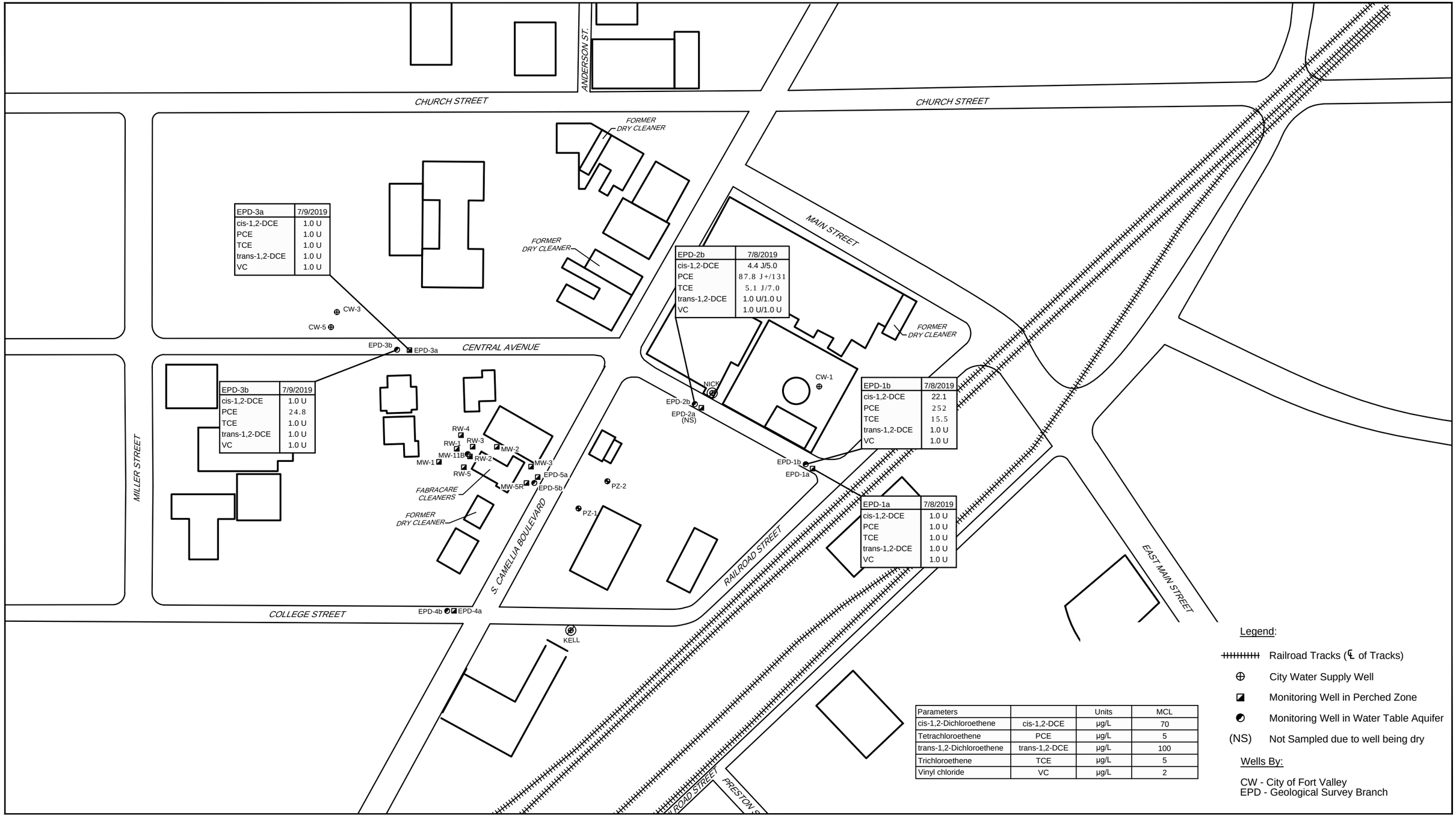
FABRACARE CLEANERS
FORT VALLEY, GEORGIA

14918-00
Sep 12, 2019

GROUNDWATER CONCENTRATION MAP-
SITE MONITORING WELLS

FIGURE 4

CAD File: N:\CA\St Catharines\Legacy\DRAWINGS\14000s\14918\14918-REPORTS\14918-00(022)\14918-00(022)GN\14918-00(022)GN-SC003.DWG



EPD-3a	7/9/2019
cis-1,2-DCE	1.0 U
PCE	1.0 U
TCE	1.0 U
trans-1,2-DCE	1.0 U
VC	1.0 U

EPD-2b	7/8/2019
cis-1,2-DCE	4.4 J/5.0
PCE	87.8 J+/131
TCE	5.1 J/7.0
trans-1,2-DCE	1.0 U/1.0 U
VC	1.0 U/1.0 U

EPD-1b	7/8/2019
cis-1,2-DCE	22.1
PCE	252
TCE	15.5
trans-1,2-DCE	1.0 U
VC	1.0 U

EPD-3b	7/9/2019
cis-1,2-DCE	1.0 U
PCE	24.8
TCE	1.0 U
trans-1,2-DCE	1.0 U
VC	1.0 U

EPD-1a	7/8/2019
cis-1,2-DCE	1.0 U
PCE	1.0 U
TCE	1.0 U
trans-1,2-DCE	1.0 U
VC	1.0 U

Parameters		Units	MCL
cis-1,2-Dichloroethene	cis-1,2-DCE	µg/L	70
Tetrachloroethene	PCE	µg/L	5
trans-1,2-Dichloroethene	trans-1,2-DCE	µg/L	100
Trichloroethene	TCE	µg/L	5
Vinyl chloride	VC	µg/L	2

Legend:

- Railroad Tracks (℄ of Tracks)
- ⊕ City Water Supply Well
- ◪ Monitoring Well in Perched Zone
- ◓ Monitoring Well in Water Table Aquifer
- (NS) Not Sampled due to well being dry

Wells By:

CW - City of Fort Valley
EPD - Geological Survey Branch

0 75 150ft

FABRACARE CLEANERS
FORT VALLEY, GEORGIA

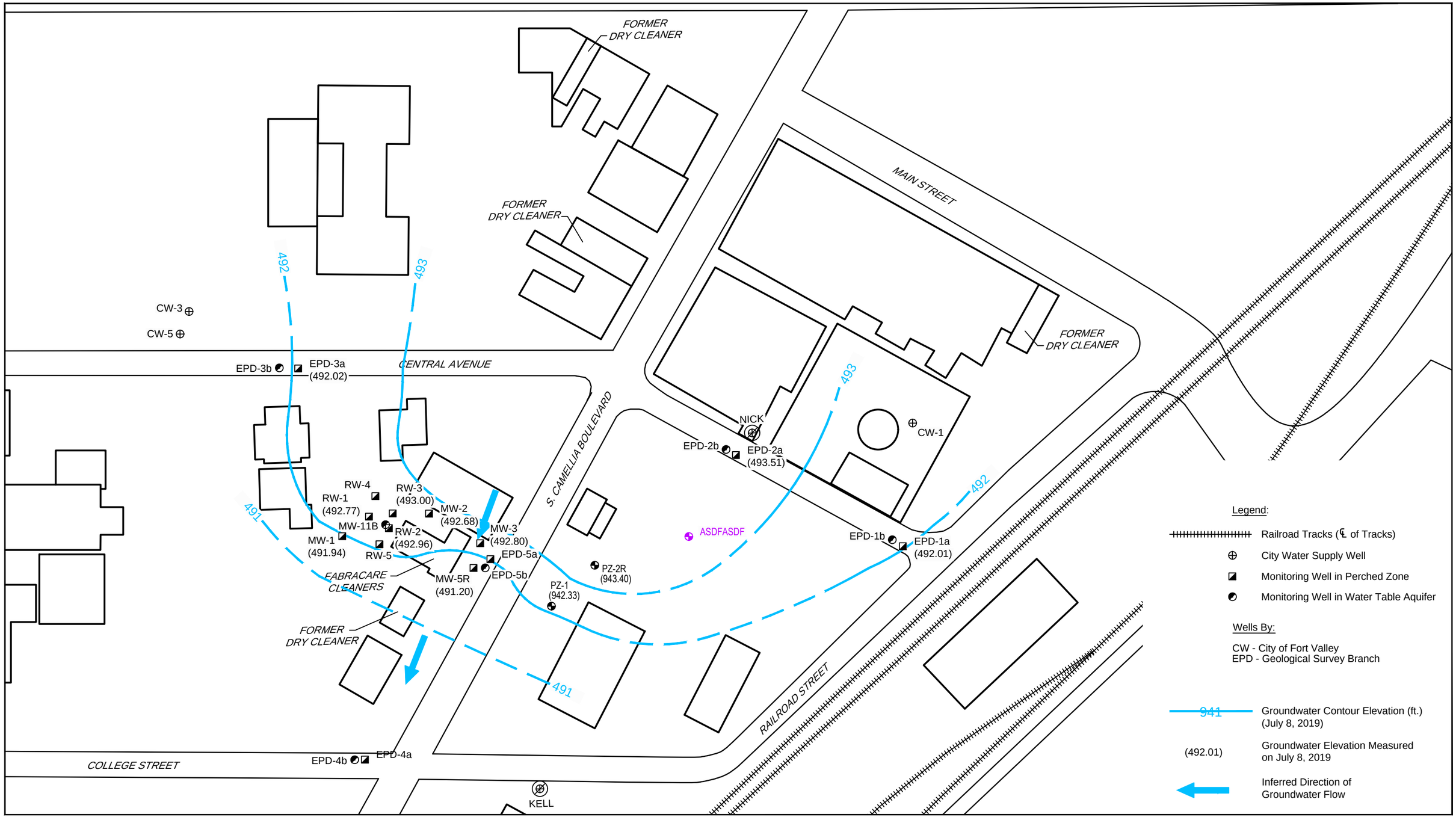
GROUNDWATER CONCENTRATION MAP - OFF-SITE MONITORING WELLS

14918-00

Sep 12, 2019

FIGURE 5

CAD File: N:\CA\St Catharines\Legacy\DRAWINGS\14000s\14918\14918-REPORTS\14918-00(022)\14918-00(022)GN\14918-00(022)GN-SC004.DWG



0 50 100ft

GHD

FABRACARE CLEANERS
FORT VALLEY, GEORGIA

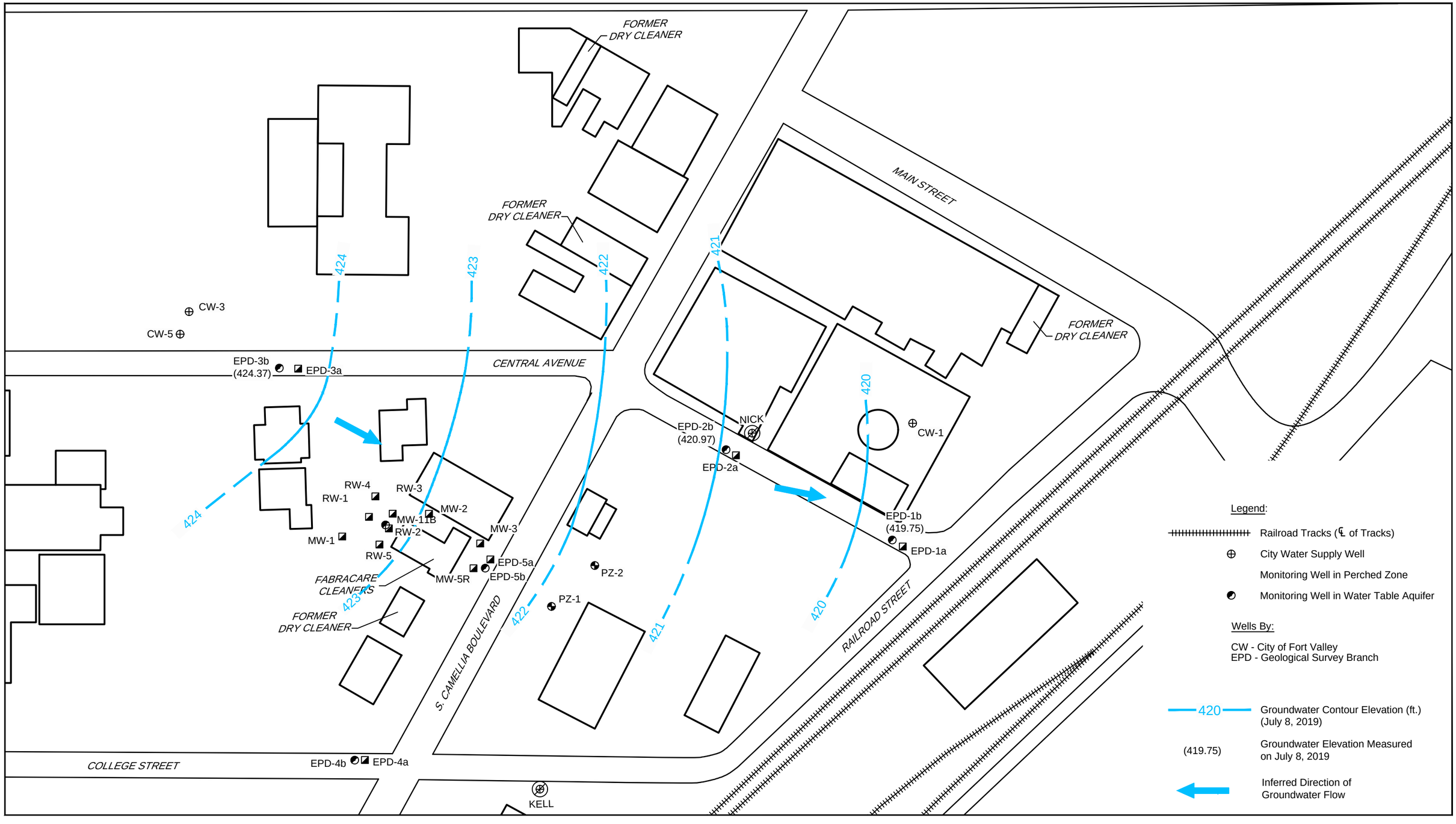
GROUNDWATER ELEVATION CONTOUR MAP - SHALLOW MONITORING WELLS - JULY 8, 2019

14918-00

Sep 12, 2019

FIGURE 6

CAD File: N:\CA\St Catharines\Legacy\DRAWINGS\14000s\14918\14918-REPORTS\14918-00(022)\14918-00(022)GN\14918-00(022)GN-SC005.DWG



0 50 100ft

FABRACARE CLEANERS
FORT VALLEY, GEORGIA

GROUNDWATER ELEVATION CONTOUR MAP - DEEP MONITORING WELLS - JULY 8, 2019

14918-00

Sep 12, 2019

FIGURE 7

CAD File: N:\CA\St Catharines\Legacy\DRAWINGS\14000s\14918\14918-REPORTS\14918-00(022)\14918-00(022)GN\14918-00(022)GN-SC006.DWG

Tables

Table 1

Analytical Results Summary
Sampling
Star Laundry Inc (aka FabraCare)
Fort Valley, Georgia

Sample Location:			**EPD-1a**	**EPD-1a**	**EPD-1b**	**EPD-1b**	**EPD-2a**	**EPD-2b**	**EPD-2b**	**EPD-2b**
Sample ID:			**GW-014918-012919-KEB-003**	**GW-014919-070819-DJB-104**	**GW-014918-012919-DJB-103**	**GW-014918-070819-DJB-103**	**GW-014918-012819-KEB-002**	**GW-014918-012819-DJB-102**	**GW-014918-070819-DJB-101**	**GW-014915-070819-DJB-102**
Sample Date:			**1/29/2019**	**7/8/2019**	**1/29/2019**	**7/8/2019**	**1/28/2019**	**1/28/2019**	**7/8/2019**	**7/8/2019**
										Duplicate
Parameters	**Units**	**MCL**								
Field Parameters										
Conductivity, field	mS/cm	--	0.107	0.111	0.198	0.116	0.097	0.284	0.178	--
Dissolved oxygen (DO), field	mg/L	--	2.82	17.43	6.41	6.3	1.72	6.45	7.21	--
Oxidation reduction potential (ORP), field	millivolts	--	342	258	278	354	347	431	310	--
pH, field	s.u.	--	5.71	5.73	5.79	4.49	6.36	5.19	4.87	--
Temperature, sample	Deg C	--	27.73	20.03	15.79	21.28	20.24	18.98	20.3	--
Turbidity, field	NTU	--	14.8	341	1000000	0.3	6.98	108	0	--
Gas										
Ethane	ug/L	--	--	--	--	--	--	--	--	--
Ethene	ug/L	--	--	--	--	--	--	--	--	--
Methane	ug/L	--	--	--	--	--	--	--	--	--
Metals										
Iron	ug/L	--	--	--	--	--	--	--	--	--
Iron (dissolved)	ug/L	--	--	--	--	--	--	--	--	--
Manganese	ug/L	--	--	--	--	--	--	--	--	--
Manganese (dissolved)	ug/L	--	--	--	--	--	--	--	--	--
VOCs										
Tetrachloroethene (PCE)	ug/L	5	1.0 U	1.0 U	**22.3**	**252**	1.0 U	**52.3**	**87.8 J+**	**131**
Trichloroethene (TCE)	ug/L	5	1.0 U	1.0 U	1.7	**15.5**	1.0 U	4.3	**5.1 J**	**7.0**
cis-1,2-Dichloroethene	ug/L	70	1.0 U	1.0 U	4.0	22.1	1.0 U	5.8	4.4 J	5.0
trans-1,2-Dichloroethene	ug/L	100	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U
Vinyl chloride	ug/L	2	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U
Wet										
Ammonia	mg/L	--	--	--	--	--	--	--	--	--
Nitrate (as N)	mg/L	--	--	--	--	--	--	--	--	--
Orthophosphate	mg/L	--	--	--	--	--	--	--	--	--
Sulfate	mg/L	--	--	--	--	--	--	--	--	--
Sulfide	mg/L	--	--	--	--	--	--	--	--	--
TOC averages	mg/L	--	--	--	--	--	--	--	--	--
Total organic carbon (TOC)	mg/L	--	--	--	--	--	--	--	--	--
Total organic carbon (TOC) (2)	mg/L	--	--	--	--	--	--	--	--	--
Total organic carbon (TOC) (3)	mg/L	--	--	--	--	--	--	--	--	--
Total organic carbon (TOC) (4)	mg/L	--	--	--	--	--	--	--	--	--
Metabolic Acids										
Lactic acid	mg/L	--	--	--	--	--	--	--	--	--
Acetic acid	mg/L	--	--	--	--	--	--	--	--	--
Propionic acid	mg/L	--	--	--	--	--	--	--	--	--
Butyric acid	mg/L	--	--	--	--	--	--	--	--	--

Footnotes:

U Not detected at the associated reporting limit.
J Estimated concentration.
UJ Not detected; associated reporting limit is estimated.

Table 1

Analytical Results Summary
Sampling
Star Laundry Inc (aka FabraCare)
Fort Valley, Georgia

Sample Location:		**EPD-3a**	**EPD-3a**	**EPD-3b**	**EPD-3b**	**MW-1**	**MW-1**	**MW-2**	**MW-2**
Sample ID:		**GW-014918-012819-KEB-001**	**GW-014918-070919-DJB-106**	**GW-014918-012819-DJB-101**	**GW-014918-070919-DJB-105**	**GW-014918-012919-KEB-004**	**GW-014918-070819-SAG-003**	**GW-014918-013119-DJB-107**	**GW-014918-070919-SAG-007**
Sample Date:		**1/28/2019**	**7/9/2019**	**1/28/2019**	**7/9/2019**	**1/29/2019**	**7/8/2019**	**1/31/2019**	**7/10/2019**
Parameters	**Units**								
Field Parameters									
Conductivity, field	mS/cm	0.034	0.03	0.092	0.053	2.98	0.302	1.02	0.38
Dissolved oxygen (DO), field	mg/L	4.54	3.35	5.08	3.9	0	0	0	0
Oxidation reduction potential (ORP), field	millivolts	419	401	427	373	-103	-166	-75	-103
pH, field	s.u.	4.62	5.05	5.29	4.28	5.92	6.21	5.95	5.6
Temperature, sample	Deg C	21.25	23.2	20.22	19.57	20.1	28.33	12.08	25.37
Turbidity, field	NTU	3.07	31.7	76.3	1.33	20.1	17.2	649	121
Gas									
Ethane	ug/L	--	--	--	--	10.0 U	10.0 U	10.0 U	--
Ethene	ug/L	--	--	--	--	11.6	10.0 U	10.0 U	--
Methane	ug/L	--	--	--	--	12300	18700	8280	--
Metals									
Iron	ug/L	--	--	--	--	598000	122000	--	--
Iron (dissolved)	ug/L	--	--	--	--	582000	122000	--	--
Manganese	ug/L	--	--	--	--	877	72.9	--	--
Manganese (dissolved)	ug/L	--	--	--	--	889	74.1	--	--
VOCs									
Tetrachloroethene (PCE)	ug/L	1.0 U	1.0 U	**5.9**	**24.8**	2.1	1.0 U	100 U	1.0 UJ-
Trichloroethene (TCE)	ug/L	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.6	100 U	1.0 UJ-
cis-1,2-Dichloroethene	ug/L	1.0 U	1.0 U	1.0 U	1.0 U	**230**	**720**	**331**	1.0 UJ-
trans-1,2-Dichloroethene	ug/L	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	100 U	1.0 UJ-
Vinyl chloride	ug/L	1.0 U	1.0 U	1.0 U	1.0 U	**2.3**	1.9	100 U	1.0 UJ-
Wet									
Ammonia	mg/L	--	--	--	--	7.5 J	2.3	--	--
Nitrate (as N)	mg/L	--	--	--	--	0.25 U	0.25 U	--	--
Orthophosphate	mg/L	--	--	--	--	2.5 UJ	2.5 UJ-	--	--
Sulfate	mg/L	--	--	--	--	1.0 U	1.0 U	--	--
Sulfide	mg/L	--	--	--	--	50.0 U	1.0 U	--	--
TOC averages	mg/L	--	--	--	--	904	16.0	16.1	--
Total organic carbon (TOC)	mg/L	--	--	--	--	907	--	15.8	--
Total organic carbon (TOC) (2)	mg/L	--	--	--	--	898	--	16.1	--
Total organic carbon (TOC) (3)	mg/L	--	--	--	--	906	--	16.3	--
Total organic carbon (TOC) (4)	mg/L	--	--	--	--	906	--	16.4	--
Metabolic Acids									
Lactic acid	mg/L	--	--	--	--	5 U	5 U	5 U	--
Acetic acid	mg/L	--	--	--	--	635	1 U	1770	--
Propionic acid	mg/L	--	--	--	--	112	1 U	257	--
Butyric acid	mg/L	--	--	--	--	275	1 U	2220	--

Footnotes:

U Not detected at the associated reporting limit.
J Estimated concentration.
UJ Not detected; associated reporting limit is estimated.

Table 1

Analytical Results Summary
Sampling
Star Laundry Inc (aka FabraCare)
Fort Valley, Georgia

Sample Location:		**MW-3**	**MW-3**	**MW-11B**	**MW-11B**	**MW-5R**	**MW-5R**
Sample ID:		**GW-014918-013019-KEB-009**	**GW-014918-071019-DJB-110**	**GW-014918-012919-DJB-104**	**GW-014918-070919-DJB-107**	**GW-014918-013119-KEB-010**	**Not Sampled**
Sample Date:		**1/30/2019**	**7/10/2019**	**1/29/2019**	**7/9/2019**	**1/31/2019**	**7/10/2019**
Parameters	**Units**						
Field Parameters							
Conductivity, field	mS/cm	--	--	0.078	0.041	--	--
Dissolved oxygen (DO), field	mg/L	--	--	6.7	10.55	--	--
Oxidation reduction potential (ORP), field	millivolts	--	--	385	327	--	--
pH, field	s.u.	--	--	4.66	4.5	--	--
Temperature, sample	Deg C	--	--	12.22	25.35	--	--
Turbidity, field	NTU	--	--	77.1	372	--	--
Gas							
Ethane	ug/L	10.0 U	--	10.0 U	10.0 U	10.0 U	--
Ethene	ug/L	10.0 U	--	10.0 U	10.0 U	10.0 U	--
Methane	ug/L	6680	--	29.4	10.0 U	2700	--
Metals							
Iron	ug/L	106000	--	3490	5390	--	--
Iron (dissolved)	ug/L	91200	--	100 U	166	--	--
Manganese	ug/L	577	--	19.2	20.8	--	--
Manganese (dissolved)	ug/L	470	--	18.7	18.6	--	--
VOCs							
Tetrachloroethene (PCE)	ug/L	**46.2 J**	1.0 U	**499**	**135**	1.0 U	--
Trichloroethene (TCE)	ug/L	**11.5 J**	1.0 U	**8.7**	**5.3**	1.0 U	--
cis-1,2-Dichloroethene	ug/L	**8970**	1.0 U	31.8	25.3	**1880**	--
trans-1,2-Dichloroethene	ug/L	51.1 J	1.0 U	1.0 U	1.0 U	2.5	--
Vinyl chloride	ug/L	**121 J**	1.0 U	1.0 U	1.0 U	**6.8**	--
Wet							
Ammonia	mg/L	1.3	--	0.20 UJ	0.20 U	--	--
Nitrate (as N)	mg/L	0.25 U	--	2.9	3.2 J-	--	--
Orthophosphate	mg/L	2.9	--	0.25 UJ	R	--	--
Sulfate	mg/L	1.0 U	--	1.0 U	R	--	--
Sulfide	mg/L	1.0 U	--	1.0 U	1.0 U	--	--
TOC averages	mg/L	440	--	1.1	1.3	7.3	--
Total organic carbon (TOC)	mg/L	444	--	1.2	--	7.3	--
Total organic carbon (TOC) (2)	mg/L	437	--	1.1	--	7.2	--
Total organic carbon (TOC) (3)	mg/L	444	--	1.1	--	7.2	--
Total organic carbon (TOC) (4)	mg/L	434	--	1.1	--	7.3	
Metabolic Acids							
Lactic acid	mg/L	5 U	--	5 U	5 U	--	--
Acetic acid	mg/L	90.4	--	24.7	1 U	--	--
Propionic acid	mg/L	69.1	--	5.89	1 U	--	--
Butyric acid	mg/L	65.6	--	8.17	1 U	--	--

Footnotes:

U Not detected at the associated reporting limit.
J Estimated concentration.
UJ Not detected; associated reporting limit is estimated.

Table 1

Analytical Results Summary
Sampling
Star Laundry Inc (aka FabraCare)
Fort Valley, Georgia

Sample Location:		**PZ-1**	**PZ-1**	**PZ-2R**	**PZ-2R**	**RW-1**	**RW-1**	**RW-1**
Sample ID:		**GW-014918-013119-KEB-011**	**GW-014918-071019-DJB-109**	**GW-014918-013119-DJB-108**	**GW-014918-070919-DJB-108**	**GW-014918-013019-KEB-006**	**GW-014918-013019-KEB-007**	**GW-014918-070819-SAG-001**
Sample Date:		**1/31/2019**	**7/10/2019**	**1/31/2019**	**7/9/2019**	**1/30/2019**	**1/30/2019 Duplicate**	**7/8/2019**
Parameters	**Units**							
Field Parameters								
Conductivity, field	mS/cm	--	--	0.152	0.132	2.6	--	0.772
Dissolved oxygen (DO), field	mg/L	--	--	3.21	1.89	0.95	--	0
Oxidation reduction potential (ORP), field	millivolts	--	--	89	176	-185	--	-151
pH, field	s.u.	--	--	5.62	5.91	6.51	--	6.39
Temperature, sample	Deg C	--	--	16.12	34.31	12.64	--	28.81
Turbidity, field	NTU	--	--	40.5	213	198	--	18.8
Gas								
Ethane	ug/L	10.0 U	--	10.0 U	10.0 U	10.0 U	--	10.0 U
Ethene	ug/L	10.0 U	--	10.0 U	10.0 U	10.0 U	--	10.0 U
Methane	ug/L	10.0 U	--	10.0 U	10.0 U	18700	--	10500
Metals								
Iron	ug/L	1620	--	1140	511	647000	--	84100
Iron (dissolved)	ug/L	100 U	--	100 U	100 U	592000	--	83300
Manganese	ug/L	1760	--	15.0 U	42.2	935	--	86.1
Manganese (dissolved)	ug/L	1680	--	27.8	15.0 U	857	--	79.7
VOCs								
Tetrachloroethene (PCE)	ug/L	**65.3**	**21.0**	**87.1**	**37.6**	3.3	3.8	1.0 U
Trichloroethene (TCE)	ug/L	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U
cis-1,2-Dichloroethene	ug/L	2.2	1.0 U	1.0	1.0 U	**236**	**235**	**172**
trans-1,2-Dichloroethene	ug/L	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U
Vinyl chloride	ug/L	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.2
Wet								
Ammonia	mg/L	0.82	--	0.20 U	0.20 U	61.9	--	45.5
Nitrate (as N)	mg/L	38.9 J	--	3.4	3.6	0.25 U	--	0.25 U
Orthophosphate	mg/L	0.25 U	--	0.25 U	R	0.25 U	--	2.5 UJ-
Sulfate	mg/L	9.1	--	46.0	66.2 J-	1.0 U	--	1.0 U
Sulfide	mg/L	1.0 U	--	1.0 U	1.0 U	50.0 U	--	1.0 U
TOC averages	mg/L	1.0 U	--	1.0 U	1.0	1600	--	586
Total organic carbon (TOC)	mg/L	1.0 U	--	1.0 U	--	1580	--	--
Total organic carbon (TOC) (2)	mg/L	1.0 U	--	1.0 U	--	1620	--	--
Total organic carbon (TOC) (3)	mg/L	1.0 U	--	1.0 U	--	1620	--	--
Total organic carbon (TOC) (4)	mg/L	1.0 U	--	1.0 U	--	1600	--	--
Metabolic Acids								
Lactic acid	mg/L	5 U	--	5 U	5 U	5 U	--	5 U
Acetic acid	mg/L	0.95 J	--	0.74 J	1.21	738	--	1 U
Propionic acid	mg/L	1 U	--	1 U	1 U	302	--	1 U
Butyric acid	mg/L	1 U	--	1 U	1 U	274	--	1 U

Footnotes:

U Not detected at the associated reporting limit.
J Estimated concentration.
UJ Not detected; associated reporting limit is estimated.

Table 1

Analytical Results Summary
Sampling
Star Laundry Inc (aka FabraCare)
Fort Valley, Georgia

Sample Location:		**RW-2**	**RW-2**	**RW-3**	**RW-3**	**RW-4**	**RW-4**	**RW-5**	**RW-5**
Sample ID:		**GW-014918-012919-KEB-005**	**GW-014918-070819-SAG-002**	**GW-014918-013019-DJB-105**	**GW-014918-070919-SAG-005**	**GW-014918-013019-DJB-106**	**GW-014918-070919-SAG-006**	**GW-014918-013019-KEB-008**	**GW-014918-070919-SAG-004**
Sample Date:		**1/29/2019**	**7/8/2019**	**1/30/2019**	**7/9/2019**	**1/30/2019**	**7/9/2019**	**1/30/2019**	**7/9/2019**
Parameters	**Units**								
Field Parameters									
Conductivity, field	mS/cm	0.213	0.21	0.323	0.197	0.42	0.168	0.571	0.319
Dissolved oxygen (DO), field	mg/L	5.43	0	0	0	0	0	2.53	0
Oxidation reduction potential (ORP), field	millivolts	-143	-107	-87	-96	-136	-113	-93	-124
pH, field	s.u.	5.94	5.81	6.2	5.98	6.47	5.99	5.25	5.65
Temperature, sample	Deg C	14.65	28.08	13.61	31.14	16.25	35.91	15.4	25.78
Turbidity, field	NTU	124	20.4	72.8	70.9	9.23	39.6	0	289
Gas									
Ethane	ug/L	10.0 U	20.0 U	10.0 U	10.0 U	10.0 U	10.0 U	10.0 U	10.0 U
Ethene	ug/L	11.9	20.0 U	13.4	10.0 U	10.0 U	10.0 U	10.0 U	10.0 U
Methane	ug/L	14900	28500	9340 J	4790	5540	5940	6470	7720
Metals									
Iron	ug/L	68700	72600	52900	55200	63700	71300	217000	55600
Iron (dissolved)	ug/L	68800	44600	50500	55300	60400	72100	209000	56700
Manganese	ug/L	94.8	167	98.6	102	68.7	76.3	540	159
Manganese (dissolved)	ug/L	91.1	62.0	99.0	102	64.6	77.1	467	146
VOCs									
Tetrachloroethene (PCE)	ug/L	1.0 U	1.0 U	2.3	1.0 U	4.0	1.0 U	**128**	2.5
Trichloroethene (TCE)	ug/L	1.0 U	1.0 U	1.7	1.0 U	1.9	1.0 U	**17.8**	2.2
cis-1,2-Dichloroethene	ug/L	**1270**	**877**	**1060**	**527**	**275**	**302**	**492**	**668**
trans-1,2-Dichloroethene	ug/L	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U
Vinyl chloride	ug/L	**12.1**	**5.7**	1.9	1.3	1.0 U	**2.3**	**6.6**	**5.9**
Wet									
Ammonia	mg/L	1.0 J	0.42	0.60	0.49	0.65	0.20 U	17.7	13.6
Nitrate (as N)	mg/L	0.25 U	0.25 U	0.25 U	0.25 U	0.25 U	0.25 U	0.25 U	4.5
Orthophosphate	mg/L	3.1 J	0.28 J-	0.25 U	R	0.25 U	R	66.0	32.9 J-
Sulfate	mg/L	1.0 U	1.0 U	1.0 U	R	1.0 U	R	30.7	7.8 J-
Sulfide	mg/L	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	50.0 U	1.0 U
TOC averages	mg/L	54.6	10	1.6	2.9	3.2	3.4	1690	366
Total organic carbon (TOC)	mg/L	54.4	--	1.7	--	3.3	--	1680	--
Total organic carbon (TOC) (2)	mg/L	54.8	--	1.7	--	3.2	--	1670	--
Total organic carbon (TOC) (3)	mg/L	54.2	--	1.5	--	3.3	--	1700	--
Total organic carbon (TOC) (4)	mg/L	54.9	--	1.7	--	2.9	--	1740	--
Metabolic Acids									
Lactic acid	mg/L	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U
Acetic acid	mg/L	4.61	1 U	2.19	1 U	1.40	1 U	115	4.42
Propionic acid	mg/L	28.1	1 U	1 U	1 U	1 U	1 U	137	95.3
Butyric acid	mg/L	1 U	1 U	1 U	1 U	1 U	1 U	494	1 U

Footnotes:

U Not detected at the associated reporting limit.
J Estimated concentration.
UJ Not detected; associated reporting limit is estimated.

Table 2

Historical Groundwater Analytical Results
Star Laundry Inc (aka FabraCare)
Fort Valley, Georgia

Well Number	MCL Value: Sample Date	Tetrachloroethene (PCE) 5 µg/L	Trichloroethene (TCE) 5 µg/L	cis-1,2-Dichloroethene 70 µg/L	trans-1,2-Dichloroethene 100 µg/L	Vinyl chloride 2 µg/L	1,4-Dioxane --
MW-1	5/24/2001	**10000**	**7.9**	13	5 U	2 U	--
	7/2/2002	**3500**	**25**	32	5 U	2 U	--
	2/12/2003	**750**	**22**	33	5 U	2 U	--
	12/11/2003	**880**	**14**	21	5 U	2 U	--
	5/12/2004	**1100**	**51**	17	5 U	2 U	--
	10/27/2004	**300**	**55**	6.4	5 U	2 U	--
	4/19/2005	**174**	**60.9**	5.1	1 U	1 U	--
	3/9/2006	**410**	**17**	18	5 U	2 U	--
DUP	3/9/2006	**400**	**18**	17	5 U	2 U	--
	7/25/2006	**8**	**5.4**	**190**	5 U	2 U	--
	10/24/2006	5 U	5 U	**280**	5 U	2 U	--
	3/8/2007	**34**	5.0 U	**520**	5.0 U	2.0 U	--
	11/17/2010	**170**	**74**	**1100**	5.0 U	2.0 U	--
	1/24/2012	**41**	1.9 J	54	5.0 U	2.0 U	--
	5/14/2013	**2100**	**120**	**430**	5.0 U	2.0 U	--
	2/19/2014	**28**	1.8	**1400**	2.0 U	**4.8**	--
	1/27/2015	**7.4**	1.6	**770**	2.0 U	1.0 U	--
	7/28/2015	1.0 U	1.0 U	**1100**	2.0 U	1.6	--
	2/18/2016	**65**	**5.7**	**490**	2.0 U	1.0 U	--
	7/27/2016	**11**	**5.3**	**630**	2.0 U	1.0 U	--
	1/9/2017	**53**	**11**	**330**	2.0 U	1.0 U	--
	7/26/2017	**71**	**21**	**230**	10 U	10 U	--
	1/11/2018	**106**	**23.1**	**493**	4.0 U	4.0 U	--
	7/23/2018	**7.2**	4.0	**760**	1.0 U	1.0 U	--
	1/29/2019	2.1	1.0 U	**230**	1.0 U	**2.3**	--
	7/8/2019	1.0 U	1.6	**720**	1.0 U	1.9	--
MW-2	5/24/2001	**12000**	**27**	49	5 U	2 U	--
	7/2/2002	**1100**	**21**	39	5 U	2 U	--
	2/12/2003	**460**	**30**	46	5 U	2 U	--
	12/11/2003	**1400**	**29**	52	5 U	2 U	--
	5/12/2004	**1700**	**31**	38	5 U	2 U	--
	10/27/2004	**1200**	**36**	34	5 U	2 U	--
	4/19/2005	**272**	**5.6**	3.8	1 U	1 U	--
	3/9/2006	**520**	**7.3**	11	5 U	2 U	--
	7/25/2006	**430**	**74**	7.4	5 U	2 U	--
	10/24/2006	**250**	**370**	**210**	5 U	2 U	--
	3/8/2007	**70**	**21**	**590**	5.0 U	2.0 U	--
	11/17/2010	**1000**	**80**	**440**	5.0 U	2.0 U	--
DUP	11/17/2010	**1300 J**	**77**	**460 J**	5.0 U	2.0 U	--

Table 2

Historical Groundwater Analytical Results
Star Laundry Inc (aka FabraCare)
Fort Valley, Georgia

Well Number	MCL Value: / Sample Date	Tetrachloroethene (PCE) 5 µg/L	Trichloroethene (TCE) 5 µg/L	cis-1,2-Dichloroethene 70 µg/L	trans-1,2-Dichloroethene 100 µg/L	Vinyl chloride 2 µg/L	1,4-Dioxane --
MW-2	1/24/2012	**3700**	**410**	**1400**	2.0 J	0.84 J	--
	5/13/2013	**3900**	**50**	**84**	5.0 U	2.0 U	--
	2/19/2014	**1500**	**28**	**110**	2.0 U	1.0 U	--
	1/27/2015	**770**	**34**	**230**	2.0 U	1.0 U	--
	2/18/2016	**460**	**7.6**	38	2.0 U	1.0 U	--
	7/28/2016	**900**	**55**	**460**	2.0 U	1.0 U	--
	1/9/2017	**190**	**8.0**	54	2.0 U	1.0 U	5.0 U
	7/26/2017	**180**	**20**	**160**	10 U	10 U	--
	1/9/2018	**174**	**21.0**	**868**	5.0 U	5.0 U	2.0 U
	7/24/2018	**139**	**11.4**	**378**	1.0 U	1.3	2.0 U
	1/31/2019	100 U	100 U	**331**	100 U	100 U	--
	7/10/2019	1.0 UJ-	1.0 UJ-	1.0 UJ-	1.0 UJ-	1.0 UJ-	--
MW-3	5/24/2001	**4100**	**220**	**100**	5 U	2 U	--
	3/9/2006	**9600**	**83**	**230**	5 U	2 U	--
	1/24/2012	**12000**	**110**	**80**	2.5 J	2.0 U	--
	5/13/2013	**3600**	**59**	42	5.0 U	2.0 U	--
	2/19/2014	**6800**	**52**	31	2.0 U	1.0 U	--
	1/27/2015	**7800**	**61**	**540**	40 U	20 U	--
	7/28/2015	**21000 J**	**61**	**690 J**	2.0 U	1.0 U	--
	2/18/2016	**3600**	**28**	**280**	2.0 U	1.0 U	--
	1/10/2017	**2300**	**35**	**970**	2.0 U	1.0 U	5.0 U
	7/26/2017	**1900**	**62**	**1400**	10 U	10 U	2.0 U
	1/10/2018	**668**	**46.9**	**1690**	20.0 U	20.0 U	2.0 U
	7/24/2018	**2070**	**52.0 J**	**8820**	1.0 U	**9.5**	--
	1/30/2019	**46.2 J**	**11.5 J**	**8970**	51.1 J	**121 J**	--
	7/10/2019	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	--
MW-5R	7/24/2018	1.9	1.0 U	**1780**	1.0 U	1.0 U	--
	1/31/2019	1.0 U	1.0 U	**1880**	2.5	**6.8**	--
MW-11B	11/18/2010	**140**	4.5 J	8.5	5.0 U	2.0 U	--
	1/25/2012	**990**	**12**	60	5.0 U	2.0 U	--
	5/14/2013	**1200**	**13**	27	5.0 U	2.0 U	--
	2/20/2014	**1200**	**16**	31	2.0 U	1.0 U	--
	1/27/2015	**1300**	**15**	25	2.0 U	1.0 U	--
	7/28/2015	**1700**	**20**	36	2.0 U	1.0 U	--
	2/18/2016	**1600**	**18**	33	2.0 U	1.0 U	--
	7/28/2016	**1900**	**20**	35	2.0 U	1.0 U	--
	1/9/2017	**1800**	**22**	44	2.0 U	1.0 U	5.0 U
	7/26/2017	**630**	**17**	42	10 U	10 U	2.0 U
	1/11/2018	**537**	**10.2**	34.0	5.0 U	5.0 U	2.0 U
	7/24/2018	**53.6**	4.5	28.5	1.0 U	1.0 U	2.0 U
	1/29/2019	**499**	**8.7**	31.8	1.0 U	1.0 U	--
	7/9/2019	**135**	**5.3**	25.3	1.0 U	1.0 U	--
RW-1	5/24/2001	**11000**	**19**	21	5 U	2 U	--
	2/12/2003	**880**	**21**	31	5 U	2 U	--
DUP	2/12/2003	**1100**	**22**	31	5 U	2 U	--
	12/11/2003	**980**	**12**	21	5 U	2 U	--
	5/12/2004	**350**	**20**	5 U	5 U	2 U	--
	10/27/2004	**170**	**23**	5 U	5 U	2 U	--
	4/19/2005	**164**	**46**	4.3	1 U	1 U	--
DUP	4/19/2005	**166**	**43.9**	4.3	1 U	1 U	--
	3/9/2006	**420**	**17**	17	5 U	2 U	--
	7/25/2006	**310**	**160**	11	5 U	2 U	--
	10/24/2006	**17**	**340**	15	5 U	2 U	--
	3/12/2007	**49**	5.0 U	**210**	5.0 U	2.0 U	--
	1/25/2012	**87**	**5.6**	**460**	5.0 U	2.0 U	--

Table 2

Historical Groundwater Analytical Results
Star Laundry Inc (aka FabraCare)
Fort Valley, Georgia

Well Number	MCL Value: Sample Date	Tetrachloroethene (PCE) 5 µg/L	Trichloroethene (TCE) 5 µg/L	cis-1,2-Dichloroethene 70 µg/L	trans-1,2-Dichloroethene 100 µg/L	Vinyl chloride 2 µg/L	1,4-Dioxane --
RW-1	5/14/2013	**650**	**92**	**980**	5.0 U	2.0 U	--
DUP	5/14/2013	**780**	**96**	**1000**	0.98 J	2.0 U	--
	2/20/2014	**22**	2.2	**2400**	2.0 U	**2.2**	--
	1/28/2015	3.8	1.0 U	**1200**	2.0 U	1.0 U	--
	7/28/2015	**7.5**	1.0 U	**1400**	2.0 U	**2.4**	--
DUP	7/28/2015	**6.4**	1.0 U	**1500**	2.0 U	**2.2**	--
	2/18/2016	**94**	5.0	**140**	2.0 U	1.0 U	--
	7/27/2016	**6.1**	2.1	**590**	2.0 U	1.0 U	--
	1/10/2017	**43**	**12**	**420**	2.0 U	1.0 U	--
	7/26/2017	10 U	10 U	**800**	10 U	10 U	--
	1/11/2018	**10.4**	5.0 U	**792**	5.0 U	5.0 U	--
DUP	1/11/2018	**11.2**	5.0 U	**721**	5.0 U	5.0 U	--
	7/23/2018	3.3	3.2	**980**	1.0 U	1.0 U	--
	1/30/2019	3.3	1.0 U	**236**	1.0 U	1.0 U	--
DUP	1/30/2019	3.8	1.0 U	**235**	1.0 U	1.0 U	--
	7/8/2019	1.0 U	1.0 U	**172**	1.0 U	1.2	--
RW-2	5/24/2001	**11000**	**19**	24	5 U	2 U	--
	2/12/2003	**550**	**12**	23	5 U	2 U	--
	12/11/2003	**1400**	**11**	30	5 U	2 U	--
	5/12/2004	**250**	**5.4**	9.2	5 U	2 U	--
	10/27/2004	**1000**	**12**	18	5 U	2 U	--
	4/19/2005	**394**	**17**	11.5	1 U	1 U	--
	3/9/2006	**670**	**14**	28	5 U	2 U	--
	7/25/2006	**700**	**90**	43	5 U	2 U	--
	10/24/2006	**140**	**370**	**100**	5 U	2 U	--
	3/8/2007	**47**	**16**	**840**	5.0 U	2.0 U	--
	1/24/2012	**9.5**	5.0 U	**1600**	5.0 U	1.2 J	--
	5/14/2013	**350**	**25**	**430**	5.0 U	2.0 U	--
	2/20/2014	2.8	1.0 U	**1800**	2.0 U	**2.3**	--
	1/27/2015	4.7	1.9	**950**	2.0 U	1.0 U	--
	7/28/2015	**44**	**15**	**860**	2.0 U	1.0 U	--
	2/18/2016	3.3	1.0 U	**690**	2.0 U	1.0 U	--
	7/27/2016	**5.7**	3.4	**540**	2.0 U	1.0 U	--
	1/10/2017	**20**	2.6	**650**	2.0 U	1.0 U	--
DUP	1/10/2017	**20**	3.0	**560**	2.0 U	1.0 U	--
	7/26/2017	**14**	10 U	**740**	10 U	10 U	--
	1/11/2018	**24.8**	10.0 U	**955**	10.0 U	10.0 U	--
	7/23/2018	4.1	1.0 U	**779**	1.0 U	1.0 U	--
	1/29/2019	1.0 U	1.0 U	**1270**	1.0 U	**12.1**	--
	7/8/2019	1.0 U	1.0 U	**877**	1.0 U	**5.7**	--
RW-3	5/24/2001	**5500**	**15**	16	5 U	2 U	--
	2/12/2003	**330**	**8.7**	9	5 U	2 U	--
	12/11/2003	**1200**	**13**	21	5 U	2 U	--
	5/12/2004	**440**	5 U	6.7	5 U	2 U	--
DUP	5/12/2004	**440**	5 U	7.1	5 U	2 U	--
	10/27/2004	**810**	**28**	12	5 U	2 U	--
	4/19/2005	**478**	**31.9**	10.3	1 U	1 U	--
	3/9/2006	**550**	**17**	23	5 U	2 U	--
	7/25/2006	**12**	**580**	15	5 U	2 U	--
	10/24/2006	**95**	**650**	24	5 U	2 U	--
DUP	10/24/2006	**87**	**650**	24	5 U	2 U	--
	3/8/2007	**55**	**8.1**	**340**	5.0 U	2.0 U	--
DUP	3/8/2007	**58**	**8.3**	**320**	5.0 U	2.0 U	--

Table 2

Historical Groundwater Analytical Results
Star Laundry Inc (aka FabraCare)
Fort Valley, Georgia

Well Number	MCL Value: Sample Date	Tetrachloroethene (PCE) 5 µg/L	Trichloroethene (TCE) 5 µg/L	cis-1,2-Dichloroethene 70 µg/L	trans-1,2-Dichloroethene 100 µg/L	Vinyl chloride 2 µg/L	1,4-Dioxane --
RW-3	1/25/2012	**97**	**14**	**1200**	5.0 U	0.64 J	--
	5/14/2013	**1300**	**330**	**1900**	2.2 J	2.0 U	--
	2/20/2014	1.0 U	1.0 U	**2200**	2.0 U	**5.9**	--
	1/28/2015	**62**	2.6	**1000**	2.0 U	**2.6**	--
	7/28/2015	3.7	1.0 U	**710**	2.0 U	1.2	--
	2/18/2016	**140**	**6.6**	**110**	2.0 U	1.0 U	--
	7/28/2016	**16**	1.8	**620**	2.0 U	1.0 U	--
	1/10/2017	**15**	2.7	**680**	2.0 U	1.0 U	--
	7/26/2017	10 U	10 U	**850**	10 U	10 U	--
	1/12/2018	5.0 U	5.0 U	**896**	5.0 U	5.0 U	--
	7/24/2018	**5.3**	3.2	**1490**	1.0 U	1.1	--
	1/30/2019	2.3	1.7	**1060**	1.0 U	1.9	--
	7/9/2019	1.0 U	1.0 U	**527**	1.0 U	1.3	--
RW-4	7/2/2002	**3400**	**6.9**	7.7	5 U	2 U	--
	2/12/2003	**320**	**12**	16	5 U	2 U	--
	12/11/2003	**1600**	5 U	6	5 U	2 U	--
	5/12/2004	**100**	**67**	5 U	5 U	2 U	--
	10/27/2004	**30**	**6**	5 U	5 U	2 U	--
	4/19/2005	**24**	**14.8**	1 U	1 U	2 U	--
	3/9/2006	**670**	**670**	**94**	5 U	2 U	--
	7/25/2006	**670**	**48**	**290**	5 U	2 U	--
	10/24/2006	**170**	**180**	**360**	5 U	2 U	--
	3/8/2007	**20**	**25**	**310**	5.0 U	2.0 U	--
	1/25/2012	**78**	**20**	**680**	5.0 U	1.4 J	--
	5/14/2013	**1100**	**24**	**90**	5.0 U	2.0 U	--
	2/20/2014	**740**	**18**	55	2.0 U	1.0 U	--
	1/28/2015	**250**	**8.1**	38	2.0 U	1.0 U	--
DUP	1/28/2015	**270**	**8.8**	50	2.0 U	1.0 U	--
	7/28/2015	**270**	**11**	**100**	2.0 U	1.0 U	--
	2/18/2016	**320**	**6.6**	19	2.0 U	1.0 U	--
DUP	2/18/2016	**290**	**6.3**	18	2.0 U	1.0 U	--
	7/28/2016	1.0 UJ	1.0 UJ	**540 J**	2.0 UJ	1.0 UJ	--
	1/10/2017	1.3	1.0 U	**890**	2.0 U	1.0 U	29
	7/25/2017	10 U	10 U	**360 J**	10 U	10 U	4.9
DUP	7/25/2017	10 U	10 U	**380**	10 U	10 U	5.4
	1/12/2018	2.0 U	2.0 U	**269**	2.0 U	2.0 U	2.0 U
	7/24/2018	2.7	1.0 U	**113**	1.0 U	1.0 U	2.0 U
DUP	7/24/2018	4.4	1.7	**136**	1.0 U	1.0 U	2.0 U
	1/30/2019	4.0	1.9	**275**	1.0 U	1.0 U	--
	7/9/2019	1.0 U	1.0 U	**302**	1.0 U	**2.3**	--
RW-5	7/2/2002	**970**	**16**	18	5 U	2 U	--
DUP	7/2/2002	**920**	**16**	18	5 U	2 U	--
	2/12/2003	**1200**	5 U	7.9	5 U	2 U	--
	12/11/2003	**1000**	**25**	23	5 U	2 U	--
DUP	12/11/2003	**1100**	**25**	22	5 U	2 U	--
	5/12/2004	**150**	5 U	5 U	5 U	2 U	--
	10/27/2004	**800**	5 U	5.6	5 U	2 U	--
DUP	10/27/2004	**720**	5 U	5.8	5 U	2 U	--
	4/19/2005	**432**	**6.3**	13.8	1 U	1 U	--
	3/9/2006	**1100**	**23**	**110**	5 U	2 U	--
DUP	3/9/2006	**1200**	**25**	**110**	5 U	2 U	--

Table 2

Historical Groundwater Analytical Results
Star Laundry Inc (aka FabraCare)
Fort Valley, Georgia

Well Number	MCL Value: Sample Date	Tetrachloroethene (PCE) 5 µg/L	Trichloroethene (TCE) 5 µg/L	cis-1,2-Dichloroethene 70 µg/L	trans-1,2-Dichloroethene 100 µg/L	Vinyl chloride 2 µg/L	1,4-Dioxane --
RW-5	7/25/2006	5 U	5 U	**990**	5 U	2 U	--
	10/24/2006	5 U	5 U	**1000**	5 U	2 U	--
	3/8/2007	**64**	**31**	**930**	5.0 U	2.0 U	--
	3/8/2007	-	**31**	-	-	-	--
	1/25/2012	**450**	**72**	**650**	5.0 U	0.58 J	--
	5/14/2013	**520**	**65**	**510**	5.0 U	2.0 U	--
	2/20/2014	**43**	**76**	**1400**	2.0 U	1.0 U	--
DUP	2/20/2014	**47**	**71**	**1400**	2.0 U	1.0 U	--
	1/28/2015	**6.3**	4.7	**1400**	2.0 U	1.0 U	--
	7/28/2015	**610**	**88**	**440**	2.0 U	1.0 U	--
	2/18/2016	**210**	**100**	**360**	2.0 U	1.0 U	--
	7/27/2016	**390**	**85**	**530**	2.0 U	1.0 U	--
	1/10/2017	**370**	**60**	**320**	2.0 U	1.0 U	5.0 U
	7/25/2017	**410**	**48**	**170**	10 U	10 U	2.0 U
	1/11/2018	**240**	**50.3**	**326**	4.0 U	4.0 U	2.0 U
	7/23/2018	**177**	**45.2**	**251**	1.0 U	1.0 U	2.0 U
	1/30/2019	**128**	**17.8**	**492**	1.0 U	**6.6**	--
	7/9/2019	2.5	2.2	**668**	1.0 U	**5.9**	--
EPD-1a	10/1/1997	5 U	5 U	5 U	5 U	2 U	--
	10/28/1997	5 U	5 U	5 U	5 U	2 U	--
	5/1/1998	5 U	5 U	5 U	5 U	2 U	--
	7/3/2002	5 U	5 U	5 U	5 U	2 U	--
	4/20/2005	1 U	1 U	1 U	1 U	1 U	--
	1/9/2018	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	--
	7/23/2018	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	--
	1/29/2019	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	--
	7/8/2019	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	--
EPD-1b	3/6/1998	**559**	**21**	8	5 U	2 U	--
	5/1/1998	**454**	5 U	5 U	5 U	2 U	--
	1/10/2002	**620**	**18**	6.2	5 U	2 U	--
	10/30/2002	5 U	5 U	5 U	5 U	2 U	--
	5/22/2003	**150**	5 U	5 U	5 U	2 U	--
	12/12/2003	**540**	**13**	5 U	5 U	2 U	--
	3/9/2006	**950**	**31**	14	5 U	2 U	--
	1/12/2018	**493**	**11.6**	14.3	4.0 U	4.0 U	--
	1/29/2019	**22.3**	1.7	4.0	1.0 U	1.0 U	--
	7/8/2019	**252**	**15.5**	22.1	1.0 U	1.0 U	--
EPD-2a	10/16/1997	0.55	5 U	5 U	5 U	2 U	--
	5/1/1998	5 U	5 U	5 U	5 U	2 U	--
	1/10/2002	5 U	5 U	5 U	5 U	2 U	--
	7/3/2002	5 U	5 U	5 U	5 U	2 U	--
	10/30/2002	5 U	5 U	5 U	5 U	2 U	--
	12/12/2003	5 U	5 U	5 U	5 U	2 U	--
	10/27/2004	5 U	5 U	5 U	5 U	2 U	--
	4/20/2005	1 U	1 U	1 U	1 U	1 U	--
	3/10/2006	**5.9**	5 U	5 U	5 U	2 U	--
	1/9/2018	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	--
	7/23/2018	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	--
	1/28/2019	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	--

Table 2

Historical Groundwater Analytical Results
Star Laundry Inc (aka FabraCare)
Fort Valley, Georgia

Well Number	MCL Value: Sample Date	Tetrachloroethene (PCE) 5 µg/L	Trichloroethene (TCE) 5 µg/L	cis-1,2-Dichloroethene 70 µg/L	trans-1,2-Dichloroethene 100 µg/L	Vinyl chloride 2 µg/L	1,4-Dioxane --
EPD-2b	3/27/1998	**501**	**18**	7	5 U	2 U	--
	5/1/1998	**771**	5 U	5 U	5 U	2 U	--
	1/10/2002	**1300**	**38**	16	5 U	2 U	--
	7/3/2002	**1200**	**32**	15	5 U	2 U	--
DUP	7/3/2002	**1200**	**35**	16	5 U	2 U	--
	10/30/2002	**250**	5 U	5 U	5 U	2 U	--
DUP	10/30/2002	**250**	5 U	5 U	5 U	2 U	--
	5/21/2003	**610**	**17**	5.6	5 U	2 U	--
DUP	5/21/2003	**530**	**17**	5.8	5 U	2 U	--
	12/12/2003	**1400**	**43**	16	5 U	2 U	--
	5/13/2004	**1200**	**36**	12	5 U	2 U	--
	10/27/2004	**660**	**19**	8.6	5 U	2 U	--
	4/20/2005	**516**	**20.7**	7.6	1 U	1 U	--
	3/10/2006	**1300**	**59**	28	5 U	2 U	--
	1/10/2018	**308**	**8.5**	7.6	2.5 U	2.5 U	--
	7/23/2018	**74.6**	**6.1**	8.4	1.0 U	1.0 U	--
	1/28/2019	**52.3**	4.3	5.8	1.0 U	1.0 U	--
	7/8/2019	**87.8 J+**	**5.1 J**	4.4 J	1.0 U	1.0 U	--
DUP	7/8/2019	**131**	**7.0**	5.0	1.0 U	1.0 U	--
EPD-3a	1/10/2002	5 U	5 U	5 U	5 U	2 U	--
	7/3/2002	5 U	5 U	5 U	5 U	2 U	--
	10/30/2002	5 U	5 U	5 U	5 U	2 U	--
	2/12/2003	5 U	-	5 U	5 U	-	--
	12/12/2003	5 U	5 U	5 U	5 U	2 U	--
	10/27/2004	5 U	5 U	5 U	5 U	2 U	--
	4/20/2005	1 U	1 U	1 U	1 U	1 U	--
DUP	4/20/2005	1 U	1 U	1 U	1 U	1 U	--
	3/9/2006	5 U	5 U	5 U	5 U	2 U	--
	1/9/2018	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	--
	7/23/2018	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	--
	1/28/2019	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	--
	7/9/2019	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	--
EPD-3b	4/15/1998	**74.3**	5 U	5 U	5 U	2 U	--
	5/1/1998	**51**	5 U	5 U	5 U	2 U	--
	7/10/2001	**88**	5 U	5 U	5 U	2 U	--
	1/10/2002	**110**	5 U	5 U	5 U	2 U	--
	7/3/2002	**160**	5 U	5 U	5 U	2 U	--
	10/30/2002	**500**	5 U	5 U	5 U	2 U	--
	5/22/2003	**32**	5 U	5 U	5 U	2 U	--
	12/12/2003	**100**	5 U	5 U	5 U	2 U	--
	5/13/2004	**130**	5 U	5 U	5 U	2 U	--
DUP	5/13/2004	**130**	5 U	5 U	5 U	2 U	--
	10/27/2004	**100**	5 U	5 U	5 U	2 U	--
	4/20/2005	**144**	5 U	5 U	1 U	1 U	--
	3/9/2006	**150**	5 U	5 U	5 U	2 U	--
	1/10/2018	**68.1**	1.0 U	1.0 U	1.0 U	1.0 U	--
	7/23/2018	2.6	1.0 U	1.0 U	1.0 U	1.0 U	--
	1/28/2019	**5.9**	1.0 U	1.0 U	1.0 U	1.0 U	--
	7/9/2019	**24.8**	1.0 U	1.0 U	1.0 U	1.0 U	--

Table 2

Historical Groundwater Analytical Results
Star Laundry Inc (aka FabraCare)
Fort Valley, Georgia

Well Number	MCL Value: Sample Date	Tetrachloroethene (PCE) 5 µg/L	Trichloroethene (TCE) 5 µg/L	cis-1,2-Dichloroethene 70 µg/L	trans-1,2-Dichloroethene 100 µg/L	Vinyl chloride 2 µg/L	1,4-Dioxane --
EPD-4a	12/12/2003	**42**	5 U	5 U	5 U	2 U	--
EPD-4b	5/1/1998	**418**	5 U	5 U	5 U	2 U	--
	7/10/2001	**720**	5 U	5 U	5 U	2 U	--
	1/10/2002	**830**	5 U	5 U	5 U	2 U	--
	7/3/2002	**220**	5 U	5 U	5 U	2 U	--
	10/30/2002	**500**	5 U	5 U	5 U	2 U	--
	5/22/2003	**160**	5 U	5 U	5 U	2 U	--
	12/12/2003	**160**	5 U	5 U	5 U	2 U	--
	5/13/2004	**330**	5 U	5 U	5 U	2 U	--
	10/27/2004	**110**	5 U	5 U	5 U	2 U	--
	4/20/2005	**362**	3.2	1.1	1 U	1 U	--
	3/9/2006	**540**	5 U	5 U	5 U	2 U	--
EPD-5a	3/16/1998	**5598**	**130**	**169**	5 U	2 U	--
	5/1/1998	**2110**	5 U	5 U	5 U	2 U	--
	7/13/1998	**8900**	400 U	400 U	400 U	400 U	--
	5/24/2001	**13000**	**110**	**72**	5 U	2 U	--
	1/10/2002	**7400**	**110**	**73**	5 U	2 U	--
	5/10/2002	**90**	5 U	8.2	5 U	2 U	--
	7/3/2002	**120**	5 U	12	5 U	2 U	--
	10/30/2002	**560**	**7.6**	18	5 U	2 U	--
	5/21/2003	**94**	5 U	41	5 U	2 U	--
	12/11/2003	**130**	**5.5**	33	5 U	2 U	--
	2/19/2004	**170**	**14**	48	5 U	2 U	--
	5/12/2004	**120**	5 U	28	5 U	2 U	--
	10/27/2004	**170**	**5.3**	25	5 U	2 U	--
	4/20/2005	**554**	**15.4**	29.4	1 U	1 U	--
	3/10/2006	**760**	**35**	**88**	5 U	2 U	--
	1/24/2012	**1400**	**60**	67	3.3 J	2.0 U	--
DUP	1/24/2012	**1900**	**59**	66	4.2 J	2.0 U	--
	5/13/2013	**1200**	**28**	20	5.0 U	2.0 U	--

Table 2

Historical Groundwater Analytical Results
Star Laundry Inc (aka FabraCare)
Fort Valley, Georgia

Well Number	MCL Value: Sample Date	Tetrachloroethene (PCE) 5 µg/L	Trichloroethene (TCE) 5 µg/L	cis-1,2-Dichloroethene 70 µg/L	trans-1,2-Dichloroethene 100 µg/L	Vinyl chloride 2 µg/L	1,4-Dioxane --
EPD-5b	3/12/1998	**177**	5 U	5 U	5 U	5 U	--
	5/1/1998	**248**	5 U	5 U	5 U	2 U	--
	7/10/2001	**1900**	**8.7**	5 U	5 U	2 U	--
	1/10/2002	**2400**	**7.8**	5 U	5 U	2 U	--
	7/2/2002	**1300**	**6.5**	5 U	5 U	2 U	--
	10/30/2002	5 U	5 U	5 U	5 U	2 U	--
	5/22/2003	**1000**	**5.5**	5 U	5 U	2 U	--
	12/11/2003	**1300**	**6.3**	5 U	5 U	2 U	--
	5/12/2004	**1100**	**22**	31	5 U	2 U	--
	10/27/2004	**1300**	**8**	5.1	5 U	2 U	--
	4/20/2005	**925**	**6.2**	3.5	1 U	1 U	--
	3/10/2006	**1600**	**10**	5.6	5 U	2 U	--
	7/25/2006	**1200**	**9.7**	5 U	5 U	2 U	--
	10/24/2006	**1600**	**12**	6.6	5 U	**5 U**	--
	3/8/2007	**2400**	**16**	13	5.0 U	2.0 U	--
	1/25/2012	**510**	4.5 J	7.4	5.0 U	2.0 U	--
	5/14/2013		Not Sampled				
PZ-1	1/25/2012	**120**	2.3 J	1.6 J	5.0 U	2.0 U	--
	5/14/2013	**43**	5.0 U	5.0 U	5.0 U	2.0 U	--
	2/20/2014	**140**	1.0 U	1.0 U	2.0 U	1.0 U	--
	1/28/2015	**690**	**6.0**	7.9	2.0 U	1.0 U	--
	7/28/2015	**480 J**	3.9	5.8	2.0 U	1.0 U	--
	2/18/2016	**180**	2.0	2.1	2.0 U	1.0 U	--
	7/28/2016	**360**	2.6	2.6	2.0 U	1.0 U	--
	1/10/2017	**110**	2.1	1.0 U	2.0 U	1.0 U	5.0 U
	7/26/2017	**100**	10 U	2 U	10 U	10 U	--
	1/10/2018	**35.8**	1.0 U	1.0 U	1.0 U	1.0 U	--
	7/24/2018	**121**	1.1	6.5	1.0 U	1.0 U	--
	1/31/2019	**65.3**	1.0 U	2.2	1.0 U	1.0 U	--
	7/10/2019	**21.0**	1.0 U	1.0 U	1.0 U	1.0 U	--
PZ-2R	2/18/2016	**48**	1.0 U	1.0 U	2.0 U	1.0 U	--
	7/28/2016	**180**	1.2	1.0 U	2.0 U	1.0 U	--
DUP	7/28/2016	**120**	1.0 U	1.0 U	2.0 U	1.0 U	--
	1/10/2017	**170**	1.3	1.3	2.0 U	1.0 U	5.0 U
	7/26/2017	**96**	10 U	2 U	10 U	10 U	2.0 U
	1/10/2018	**24.3**	1.0 U	1.0 U	1.0 U	1.0 U	2.0 U
	7/24/2018	**48.7**	1.0 U	1.0 U	1.0 U	1.0 U	2.0 U
	1/31/2019	**87.1**	1.0 U	1.0	1.0 U	1.0 U	--
	7/9/2019	**37.6**	1.0 U	1.0 U	1.0 U	1.0 U	--

Notes

J - Estimated concentration at associated value.
U - Not detected at the associated reporting limit.
µg/L - Micrograms per Liter.
DUP - Duplicate Sample.
- Bold indicates values above the EPA Maximum Contaminant Level (MCL).

Table 3

Groundwater Elevation Gauging Data
Star Laundry Inc (aka FabraCare)
Forth Valley, Georgia

Well Number	*Top Of Casing Elevation (ft)*	*Total Depth (ft.)*	*Date Measured*	*Depth To Water (ft)*	*Groundwater Elevation (ft)*
Shallow Zone					
MW-1	519.08	29.03	7/8/2019	27.14	491.94
MW-2	518.63	27.23	7/8/2019	25.95	492.68
MW-3	518.50	25.90	7/8/2019	25.70	492.80
MW-5R	518.25	28.41	7/8/2019	28.44	491.20
PZ-1	517.96	26.52	7/8/2019	25.63	492.33
PZ-2R	519.11	30.88	7/8/2019	26.38	493.40
RW-1	519.13	32.23	7/8/2019	26.36	492.77
RW-2	518.99	30.30	7/8/2019	26.03	492.96
RW-3	518.91	31.55	7/8/2019	25.91	493.00
RW-4	NM	32.20	7/8/2019	26.12	--
RW-5	NM	32.46	7/8/2019	26.99	--
EPD-1a	520.11	31.13	7/8/2019	28.10	492.01
EPD-2a	519.10	25.79	7/8/2019	25.59	493.51
EPD-3a	519.23	30.15	7/8/2019	27.21	492.02
Deep Zone					
MW-11B	NM	124.30	7/8/2019	109.42	--
EPD-1b	520.04	110.70	7/8/2019	100.29	419.75
EPD-2b	519.08	103.47	7/8/2019	98.11	420.97
EPD-3b	519.28	105.60	7/8/2019	94.91	424.37

Table 4

Summary of J&E Inputs, Risk, and Hazard by Well Location
Star Laundry Inc. (aka FabraCare)
Fort Valley, Georgia

Well Number	*Date Measured*	*Depth To Water (ft)*	*Depth To Water (m)*	*Temperature (Deg C)*	*Statum C thickness (m) (1)*
RW-3	7/9/2019	25.92	7.90	26.06	1.20
RW-5	7/9/2019	27.00	8.23	24.64	1.53

Notes:

(1) Stratum C thickness calculated based on depth to water less Stratum A thickness of 4.57 m and Stratum B thickness of 2.13 m.

Sample Location: RW-3	*Groundwater Concentration*	*Incremental cancer risk from vapor intrusion*	*Hazard quotient from vapor intrusion*
Sample Date: 7/9/2019	*ug/L*		
cis-1,2-Dichloroethene	527	No IUR	3E-04
Tetrachloroethene	1.0 U	NC	NC
Trichloroethene	1.0 U	NC	NC
Vinyl chloride	1.3	4E-08	2E-04
Total		4E-08	6E-04

Sample Location: RW-5	*Groundwater Concentration*	*Incremental cancer risk from vapor intrusion*	*Hazard quotient from vapor intrusion*
Sample Date: 7/9/2019	*ug/L*		
cis-1,2-Dichloroethene	668	No IUR	4E-04
Tetrachloroethene	2.5	1E-09	3E-04
Trichloroethene	2.2	5E-08	4E-03
Vinyl chloride	5.9	2E-07	1E-03
Total		2E-07	6E-03

Notes:

NC - not calculated
No IUR - No Incremental Unit Risk toxicity available
(1) ATSDR MRL for cis-1,2-dichloroethene used to calculate hazard quotient

Appendices

Appendix A
Historical Timeline

Appendix A Star Laundry Inc. (aka FabraCare) Historic Timeline

August 8, 1996	Owners of Woolfolk Chemical advise FVUC that raw water samples from City wells 1 and 2 had detectable concentrations of PCE. Results were reported below standard; PCE was not detected in treated water. FVUC shuts down wells on a precaution.
April 29, 1997	EPD discussed other potential release locations with EPA's CERCLA Pre-Remedial Program.
June 3, 1997	EPD made formal proposal to EPA for approval, pursuant to the Superfund Accelerated Cleanup Model (SACM), to conduct CERCLA Site Inspections (SI) at 6 locations, one being FabraCare. Approval was granted, and EPD, with funding from EPA, conducted SIs at the six locations. Note: The former laundry and dry cleaning facility adjoining FabraCare (currently occupied by Splish-Splash Car Wash) was not identified for investigation.
January 1998	EPD installs first series of monitoring wells; EPD-5a installed in perched aquifer in front of FabraCare; 5,598 µg/L PCE detected in groundwater.
January 15, 1998	PCE detected in City well CW-5 (sampled by FVUC). (Note: PCE was not detected in CW-5 during any of the sampling events conducted for over five years following initial detection).
February 1998	EPD-5b installed in water table aquifer in front of FabraCare.
March 26, 1998	EPA and EPD's Site visit indicated FabraCare was operating in compliance with hazardous waste generator requirements under RCRA. First RCRA generator inspection of FabraCare completed in 1995 and concluded the facility was operating in compliance.
May 12, 1998	SI for FabraCare finalized.
July 25, 1998	The EPD's Geological Survey Branch (GSB) completed a draft of the report on GSB's work to date on the Fort Valley investigation. A transmittal memo for the October 1998 final report , indicates that the following conclusions were expressed in the earlier draft: "In brief, the Survey [GSB] concludes that the FabraCare Cleaners site is a probable source of the PCE contamination encountered in the soil, in the groundwater, and in City wells CW-1 and CW-2; that Anthoines' Machine Shop and the Woolfolk Chemical NPL Site are probably not sources of the PCE contamination; and that five additional sites remain candidate PCE-release sites because additional data are needed to draw a conclusion. There may well be other PCE contributors but we do not believe it is necessary that additional release sites are required to explain the PCE detections in the soil, groundwater and City wells" (Carter, 1998).

July 1998	EPA conducted soil and groundwater investigation at the FabraCare Site.
August 19, 1998	EPD issued an Emergency Order under authority of Georgia's Safe Drinking Water Act to Star Laundry, Inc. (the entity that owns the FabraCare facility and property). This order required Star Laundry to properly close City wells CW-1, CW-2, *and* CW-5 and to provide "equivalent public water supply wells to be located in an uncontaminated area approved by EPD" within one year.
May 1999	Golder Associates, Inc. conducted a subsurface investigation of the FabraCare property for Star Laundry. A draft report on this work dated July 16, 1999, was forwarded to EPA on September 21, 1999. -17 borings were advanced utilizing DPT; 7 borings advanced to 15 feet below ground surface (ft bgs) under building. At 3 of those borings, soil vapor monitoring wells were installed. Outside the building the DPT locations were advanced to 28-30 ft bgs. The groundwater in MW-1 and MW-2 was sampled; MW-3 was dry. The highest concentrations of PCE in soil beneath the building was 15,700 µg/kg at IB-1 and 12,000 µg/kg at IB-3. PCE was non-detect or below 180 µg/kg in all samples collected from the 24-28 ft bgs zone.
1999	Star Laundry appealed the Emergency Order to the Office of State Administrative Hearings (Altman, 1999) and then to Superior Court. On March 31, 1999, the Chief Judge of the Superior Court of Houston County Judicial Circuit ordered that the Emergency Order be remanded for reconsideration due to the court's conclusion "that the emergency order directing the replacement by a private business of three city wells at a cost of millions of dollars is oppressive, overreaching, and unnecessary" (Nunn, 1999).
May 10, 1999	EPD referred the case to EPA for enforcement under federal authorities. On May 14, 1999 EPD entered into a contract with FVUC, in which EPD advanced to FVUC 50% of a $250,000 grant from the Hazardous Waste Trust Fund for the cost of extending water mains to the locations for the new city wells, CW-6/7 and CW-8. On September 3, 1999, EPA issued a RCRA Administrative Order (AO) to Star Laundry.
1999 – 2000	New City wells CW-6 and CW-7 were installed to replace CW-1 and CW-2; the new wells were connected by new water mains to the City treatment plant. Cost for well replacement, not including additional system upgrades estimated at approximately $3 million.
September 3, 1999	Administrative Order issued. Required Characterization Work Plan within 45 days.
November 8, 1999	CRA submitted Characterization Work Plan to fully characterize the FabraCare Site per the Order.
November 29, 1999	CRA submitted a Well Survey Report per the Order; no private wells being used for potable water identified other than City wells.

February 10, 2000	EPA review comments on Characterization Work Plan received.
March 13, 2000	Revised Characterization Work Plan submitted to EPA.
2000	CRA began groundwater monitoring activities.
February 15, 2001	EPA approved Characterization Work Plan after requested revisions made.
March 21, 2001	Revision of Well Survey Report submitted.
May 2001	CRA installed three 4-inch diameter soil vapor extraction wells.
November 2001	CRA installed two additional 4-inch diameter soil vapor extraction wells.
December 2001	Soil Vapor Extraction (SVE) system installed.
January 2002	SVE system full-scale operation began.
October 2003	Total PCE Removal by SVE is estimated as 608 pounds.
November 2004	SVE system reached steady state; only 57 pounds of PCE removed in over one year of operation.
June 17, 2005	CRA proposed modification to interim remedy being performed at the Site submitted to EPA. CRA proposed in situ chemical injection in lieu of expanding SVE system (due to biodegradation naturally occurring at the Site; sodium lactate would enhance this process).
February 22, 2006	EPA issued conditional approval of proposed chemical injection (in lieu of SVE expansion).
March 2006	CRA collected groundwater samples from existing and newly-installed monitoring wells.
April 12, 2006	Class V Underground Injection Pilot Test Notification submitted to EPD by letter April 12, 2006.
April 2006	First chemical injection (pilot) event using sodium lactate conducted at the Site. Sodium lactate injected at 16 DPT points at 27-28 ft bgs and 21-23 ft bgs. Potassium permanganate injected near EPD-5B at one location; approximately 500 gallons of permanganate were injected into 1 DPT boring into the sand layer atop the kaolin layer located upgradient of EPD-5B.
July 2006	First quarterly sampling conducted; results indicated the following: Initial results of the first quarterly sampling conducted after injection show a general decrease in PCE in samples from MW-1, MW-2, and the SVE wells, with a corresponding increase in degradation parameters TCE and cis-DCE from biological degradation. The most dramatic effects are seen in MW-1 and RW-5: PCE has dropped from 410 μg/L to 8 μg/L in MW-1, and from 1,100 μg/L to non-detect in RW-5. These results show that the injection of a reductant has strong potential for reducing the chlorinated hydrocarbons observed at a relatively rapid rate; dramatic effects of enhanced bioremediation from injection are typically not observed until 6 to 12 months after injection.
October 2006	Quarterly performance groundwater monitoring conducted.

March 2007	Quarterly performance groundwater monitoring conducted; results from October 2006 and March 2007 indicated the following: The dramatic decreases in PCE concentrations seen in the samples collected from MW-1 and RW-5 in July 2006 were not observed in the sample results for the samples collected in October 2006 and March 2007, however, the PCE concentrations across the Site generally appear to be showing a trend of decreasing concentrations compared with historical data. The TCE concentrations in several wells generally appear to show increases that would be expected to accompany the degradation of PCE. The measurable increases in the concentration of cis-1,2-Dichloroethane in the majority of the wells sampled provides additional evidence that the PCE in the perched water at the Site is undergoing degradation. Dissolved oxygen (DO) and oxidation-reduction potential (field measured indicator parameters) generally decreased in the samples collected in October 2006 and March 2007. These decreases provide additional evidence of the effectiveness of the degradation of PCE as a result of the chemical injection completed in April 2006.
May 2007	CRA submitted a Remedial Progress Report to EPA.
October – December 2009	CRA sampled on-site drums and SVE tank for waste disposal characterization.
December 2009 – February 2010	CRA oversight of drum and SVE tank waste disposal.
May 2013	Baseline groundwater monitoring performed for the upcoming injection event in September 2013.
September 2013	CRA provided oversight of injection of Emulsified Vegetable Oil (EVO) using DPT.
February 2014	Post-injection performance monitoring conducted.
January 2015	Post-injection performance monitoring conducted; results from this monitoring event indicated the level of treatment of PCE and TCE was positive, but further monitoring would be required to confirm overall effectiveness of the treatment.
April 2015	January 2015 Semi-Annual Groundwater Monitoring Report submitted to EPA.
July 2015	Annual groundwater monitoring conducted and was also used to monitor the remedial effectiveness of the September 2013 injection; results indicated that EVO was becoming depleted.
September 30, 2015	EPA submitted comments for April 2015 Progress Report (including January 2015 Semi-Annual Groundwater Monitoring Report) via email.
October 2015	July 2015 Semi-Annual Groundwater Monitoring Report submitted to EPA; additional injection proposed.
November 5, 2015	Meeting with EPA to discuss future remediation activities (EVO injection) for the Site.

November 25, 2015	GHD submitted response to comments to EPA.
February 16, 2016	GHD provided oversight of shallow monitoring well installation using DPT. Monitoring wells EPD-5A and PZ-2 were replaced with MW-5R and PZ-2R, respectively.
February 18, 2016	GHD conducted groundwater monitoring activities. The results will serve as the baseline data for the April 2016 EVO injection.
April 13 – 15, 2016	GHD provided oversight of DPT injections of EVO into 14 locations on-Site.
June 20, 2016	Submitted February 2016 Semi-Annual Groundwater Monitoring Report to EPA.
July 14, 2016	Received comments from EPA regarding the July 2015 Progress Report.
August 15, 2016	Submitted letter response to EPA comments regarding the July 2015 Progress Report.
February 9, 2017	Meeting with Dr. Harbhajan Singh at EPA.
March 15, 2017	Received comments from EPA regarding the February 2016 Progress Report.
April 10, 2017	Letter submitted to EPA by GHD titled: *Evaluation Summary of Potential Historical Sites of Environmental Interest in Proximity to Star Laundry Inc.* as requested by EPA.
April 15, 2017	Bi-Monthly Progress Report submitted to EPA.
June 15, 2017	Bi-Monthly Progress Report submitted to EPA.
July 25 – 26, 2017	GHD conducted semi-annual groundwater monitoring activities.
August 15, 2017	Bi-Monthly Progress Report submitted to EPA.
August 17, 2017	Email received from Dr. Harbhajan Singh of EPA requesting the sampling of off Site monitoring wells previously installed by the EPD.
October 16, 2017	Bi-Monthly Progress Report submitted to EPA.
December 15, 2017	Bi-Monthly Progress Report submitted to EPA.
January 8-12, 2018	GHD conducted semi-annual groundwater monitoring activities; including the sampling of EPD-1a, EPD-1b, EPD-2a, EPD-2b, EPD-3a and EPD-3b at the request of the EPA.
February 12, 2018	Letter from EPA received requesting a vapor intrusion assessment at the Site.
February 15, 2018	Bi-Monthly Progress Report submitted to EPA.
March 26, 2018	Email received from EPA requesting meeting to discuss overall Site details and progress with property owner.
March 27, 2018	GHD submitted a response to the February 12, 2018 EPD vapor intrusion assessment request letter including calculations showing risk levels to be below levels requiring further assessment.
April 2, 2018	GHD submitted the January 2018 Semi-Annual Groundwater Monitoring Report.

April 12, 2018	As requested GHD and Hitch Law met with the EPA to discuss the Site with the property owner, Anthony Clark. He did not appear for the meeting. Meeting was held to discuss general Site details and progress with Dr. Singh and others from Region 4 EPA, as well as, representatives from the GA EPD.
April 16, 2018	Bi-Monthly Progress Report submitted to the EPA.
April 23, 2018	EPA receives confirmation from property owner representative, Anthony Clark, that he can attend a rescheduled meeting at the EPA office on April 26, 2018.
April 26, 2018	Meeting at EPA office attended by GHD, Hitch Law Firm and Anthony Clark, the property owner's representative.
May 7, 2018	GHD supplied Dr. Singh with 2017 costs table as requested.
May 14, 2018	EPA letter issued requiring additional information and response regarding the vapor intrusion recalculations performed by GHD for the March 27, 2018 letter.
May 25, 2018	An email from the EPA was received documenting review of and providing comments on the January 2018 Semi-Annual Groundwater Monitoring Report. An alternative injection chemical, EHC-Liquid (EHC-L), was proposed to the EPA in a reply to this email.
May 29, 2018	EHC-L product data sheets and available case studies were provided to the EPA by email as requested.
June 6, 2018	The EPA replied by email on with a request for a "Work Plan/Scope of Work, containing the site-specific details on Remedial Strategy, Solution/Solution Mixture, Application Method(s), and so on within 30 days".
June 14, 2018	GHD submitted a work plan to conduct additional in situ chemical injection activities at the Site.
June 14, 2018	EPA approves 2017 costs table provided by GHD. Requests 2018 costs table be submitted by March 30, 2019.
June 15, 2018	Bi-Monthly Progress Report submitted to EPA.
June 26, 2018	GHD submitted a response to the EPA's response to GHD's letter vapor intrusion letter.
June 27, 2018	The EPA approved the June 14, 2018 work plan for proposed in situ chemical injection event.
July 23-25, 2018	GHD conducted Semi-Annual Groundwater Monitoring at the Site with only one anomaly noted, EPD-1b had an obstruction preventing sampling at approximately 25 feet bgs. EPA was notified.
July 26, 2018	GHD submitted a Class V Underground Injection Control Permit Application to the GA EPD for proposed in situ chemical injection activities at the Site.
August 15, 2018	Bi-Monthly Progress Report submitted to the EPA.
September 4, 2018	EPA letter received in response to GHD's June 26, 2018 letter referencing vapor intrusion calculations accepting responses, but requesting additional calculations to be performed with data from the next semi-annual sampling event (scheduled for January 2019).

October 2, 2018	GA EPD approved the July 26, 2018 Class V Underground Injection Permit Application and issued Permit No. GAW000719.
October 15, 2018	July 2018 Semi Annual Groundwater Monitoring Report for the Site was submitted to the EPA.
November 2, 2018	EPA recommended the analysis of 1,4 dioxane for all Site monitoring wells by Method 522 with a reporting limit of 0.3 ug/L to be compared to drinking water standards.
November 5, 2018	GHD replied on November 5, 2018 that since this compound was not likely associated with dry cleaning operations, but rather the former automotive repair shop adjacent to the property and drinking water wells had been replaced at a considerable cost already, the group would not agree to use this method, but would agree to continue the sampling of the 6 wells with the highest VOC concentrations with the current method and detection limit.
November 9, 2018	The EPA responded requesting Method 522 analysis for 1,4 dioxane in the 6 wells with the highest VOCs during the next sampling event.
November 13, 2018	The EPA requested submittal of J&E Modeling results with the July 2018 Semi Annual Groundwater Monitoring Report.
November 19, 2018	GHD replied that since the request to complete J&E modeling using temperature measurements gathered from inside the well rather than a flow cell was received from the EPA after the July 2018 sampling event took place that this would have to be done during the January 2019 event and would be included in that resulting report. The EPA agreed to this through email.
November 12-16	GHD conducted in situ chemical injection activities at the Site; injection EHC-L.
November 29-30	GHD conducted remaining in situ chemical injection activities at the Site; injection EHC-L. The Site building was reported to the EPA as remaining vacant.
November 29, 2018	A broken expandable cap assembly was removed from inside EPD-1b in order to allow for future sampling. Since this monitoring well is located in the road it is likely this was caused by the well being run over by vehicles over a long time period.
December 15, 2018	Bi-Monthly Progress Report submitted to the EPA.
January 11, 2019	GHD notified EPA of January 2018 groundwater sampling schedule and agreed to conduct sampling of 1,4 dioxane by current method rather than Method 522 with the 0.3 ug/L detection limit.
January 29, 2019	EPA responded that 1,4 dioxane analysis would not be required during this sampling event, but repeated the request for a QAPP to be submitted for sampling by Method 522.
January 28-31, 2019	Semi-annual groundwater sampling took place at the Site.
January 30, 2019	Eight drums containing residual EHC-L were removed from the Site for disposal.
February 15, 2019	Bi-Monthly Progress Report submitted to the EPA.

March 11, 2019	EPA requested QAPP to be submitted for sampling for 1,4 dioxane by Method 522.
March 18, 2019	GHD replied that the request was being discussed with the group.
April 15, 2019	Bi-Monthly Progress Report submitted to the EPA.
May 8, 2019	January 2019 Semi Annual Groundwater Monitoring Report for the Site was submitted to the EPA.
June 15, 2019	Bi-Monthly Progress Report submitted to the EPA.
June 18, 2019	EPA issued a comment letter for the January 2019 Groundwater Sampling Report submitted by GHD.
July 7-10, 2019	Semi-annual groundwater sampling took place at the Site.
July 31, 2019	GHD submitted a response letter to EPA addressing the items in the June 18, 2019 comment letter issued by EPA.
August 15, 2019	Bi-Monthly Progress Report submitted to the EPA.

Appendix B
Field Sampling Forms

MONITORING WELL RECORD FOR LOW-FLOW PURGING

Project Data:

Project Name:	Fabracare	Date:	July 8, 2019
Ref. No.:	14918	Personnel:	S. Grace

Monitoring Well Data:

Well No.:	**MW-1**	Screen Length (ft):	NA
Pump Type:	Peristaltic	Depth to Pump Intake (ft):	28
Measurement Point:	TOC	Well Diameter, D (in):	2
Constructed Well Depth (ft):	NA	Well Screen Volume, V_s (Gal):	0.30
Measured Well Depth (ft):	29.06	Initial Depth to Water (ft):	27.14
Depth of Sediment (ft):	-	Total Volume Purged (gal):	0.6

Time	*Pumping Rate (mL/min)*	*Depth to Water (ft)*	*Drawdown from Initial Water Level (ft)*	*Temperature °C*	*Conductivity (mS/cm)*	*Turbidity NTU*	*DO (mg/L)*	*pH*	*ORP (mV)*
			Precision Required:	***±3 %***	***±0.005 or 0.01***	***±10 %***	***±10 %***	***±0.1 Units***	***±10 mV***
Begin @ 13:34									
13:50	50	27.18	0.04	30.63	0.318	72.5	0.00	6.15	-144
13:55	50	27.20	0.06	28.13	0.307	63.9	0.00	6.11	-146
14:00	50	27.21	0.07	27.98	0.3	51.4	0.00	6.09	-148
14:05	50	27.23	0.09	27.56	0.302	40.2	0.00	6.11	-152
14:10	50	27.25	0.11	27.18	0.303	33.9	0.00	6.13	-155
14:15	50	27.26	0.12	27.4	0.304	22.4	0.00	6.17	-162
14:20	50	27.27	0.13	27.63	0.305	18.9	0.00	6.19	-165
14:25	50	27.29	0.15	27.84	0.306	17.3	0.00	6.20	-164
14:30	50	27.30	0.16	28.33	0.302	17.2	0.00	6.21	-166
	Sample Time 14:40		**GW-014918-070819-SAG-003**					Fe2+: 3.11	
			Containers	Preservatives	Analysis			D.N. Temp: 26.43	
			3 x 40mL VOAs	HCl	SSPL VOCs				
			3 x 40mL VOAs	None	Methane, Ethane, Ethene (MEE)				
			3 x 40mL VOAs	H3PO4	TOC				
			1 x 250 mL	HNO_3	Total Iron & Manganese				
			1 x 250 mL	HNO3	Dissolved Iron & Manganese		FIELD FILTER		
			1 x 125 mL	H2SO4	Ammonia, Nitrogen (as N)				
			1 x 250 mL	unpreserved	Orthophosphate-phosphorus, Nitrate, Sulfate				
			1 x 125 mL	ZnAc	Sulfide				

MONITORING WELL RECORD FOR LOW-FLOW PURGING

Project Data:

Project Name: Fabracare
Ref. No.: 14918
Date: July 10, 2019
Personnel: S. Grace

Monitoring Well Data:

Well No.: **MW-2**
Pump Type: Peristaltic
Measurement Point: TOC
Constructed Well Depth (ft): NA
Measured Well Depth (ft): 27.2
Depth of Sediment (ft): -
Screen Length (ft): NA
Depth to Pump Intake (ft): -
Well Diameter, D (in): 2
Well Screen Volume, V_s (Gal): 0.20
Initial Depth to Water (ft): 25.95
Total Volume Purged (gal): 0.5

Time	*Pumping Rate (mL/min)*	*Depth to Water (ft)*	*Drawdown from Initial Water Level (ft)*	*Temperature °C*	*Conductivity (mS/cm)*	*Turbidity NTU*	*DO (mg/L)*	*pH*	*ORP (mV)*
			Precision Required:	***±3 %***	***±0.005 or 0.01***	***±10 %***	***±10 %***	***±0.1 Units***	***±10 mV***
Begin @ 7:35									
7:50	50	26.01	0.06	25.44	0.368	12.1	0.00	5.46	-77
7:55	50	26.53	0.58	25.39	0.375	79.2	0.00	5.51	-92
8:00	50	27.1	1.15	25.37	0.38	121	0.00	5.60	-103
8:05	Dry								
	Sample Time 8:40		**GW-014918-071019-SAG-007**					Fe2+: NM	
			Containers	Preservatives	Analysis			D.H. Temp: NM	
			3 x 40mL VOAs	HCl	SSPL VOCs				
			3 x 40mL VOAs	None	Methane, Ethane, Ethene (MEE)				
			3 x 40mL VOAs	H3PO4	TOC				
			1 x 250 mL	HNO_3	Total Iron & Manganese				
			1 x 250 mL	HNO3	Dissolved Iron & Manganese		FIELD FILTER		
			1 x 125 mL	H2SO4	Ammonia, Nitrogen (as N)				
			1 x 250 mL	unpreserved	Orthophosphate-phosphorus, Nitrate, Sulfate				
			1 x 125 mL	ZnAc	Sulfide				
			1x SiREM filter sample						
			3 x 40mL VOAs	HCL					
			1 x 60ml unpres	unpreserved	GHD met. Acids				

MONITORING WELL RECORD FOR LOW-FLOW PURGING

Project Data:

Project Name:	Fabracare	Date:	7/8/19 and 7/10/19
Ref. No.:	14918	Personnel:	D. Brytowski

Monitoring Well Data:

Well No.:	**MW-3**	Screen Length (ft):	NA
Pump Type:	Peristaltic	Depth to Pump Intake (ft):	-
Measurement Point:	TOC	Well Diameter, D (in):	2
Constructed Well Depth (ft):	NA	Well Screen Volume, V_s (Gal):	-
Measured Well Depth (ft):	25.91	Initial Depth to Water (ft):	25.7
Depth of Sediment (ft):	-	Total Volume Purged (gal):	-

Time	*Pumping Rate (mL/min)*	*Depth to Water (ft)*	*Drawdown from Initial Water Level (ft)*	*Temperature ^{o}C*	*Conductivity (mS/cm)*	*Turbidity NTU*	*DO (mg/L)*	*pH*	*ORP (mV)*
			Precision Required:	***±3 %***	***±0.005 or 0.01***	***±10 %***	***±10 %***	***±0.1 Units***	***±10 mV***
DRY									
	Sample Time 9:30		**GW-014918-071019-DJB-110**						
			Containers	Preservatives	Analysis				
			3 x 40mL VOAs	HCl	SSPL VOCs	Sampled with small amount of water			
			3 x 40mL VOAs	None	Methane, Ethane, Ethene (MEE)				
			3 x 40mL VOAs	H3PO4	TOC				
			1 x 250 mL	HNO_3	Total Iron & Manganese				
			1 x 250 mL	HNO3	Dissolved Iron & Manganese	FIELD FILTER			
			1 x 125 mL	H2SO4	Ammonia, Nitrogen (as N)				
			1 x 250 mL	unpreserved	Orthophosphate-phosphorus, Nitrate, Sulfate				
			1 x 125 mL	ZnAc	Sulfide				
				*****	Dehalococcoides mccartyi microbial analysis by PCR (send to SiREM)				

MONITORING WELL RECORD FOR LOW-FLOW PURGING

Project Data:

Project Name:	Fabracare	Date:	July 9, 2019
Ref. No.:	14918	Personnel:	D. Brytowski

Monitoring Well Data:

Well No.:	**MW-5R**	Screen Length (ft):	10
Pump Type:	Peristaltic	Depth to Pump Intake (ft):	-
Measurement Point:	TOC	Well Diameter, D (in):	1
Constructed Well Depth (ft):	28.5	Well Screen Volume, V_s (Gal):	-
Measured Well Depth (ft):	28.44	Initial Depth to Water (ft):	28.44
Depth of Sediment (ft):	-	Total Volume Purged (gal):	-

Time	*Pumping Rate (mL/min)*	*Depth to Water (ft)*	*Drawdown from Initial Water Level (ft)*	*Temperature ^{o}C*	*Conductivity (mS/cm)*	*Turbidity NTU*	*DO (mg/L)*	*pH*	*ORP (mV)*
			Precision Required:	***±3 %***	***±0.005 or 0.01***	***±10 %***	***±10 %***	***±0.1 Units***	***±10 mV***
Dry, no sample									
	Sample Time		**GW-014918- NO SAMPLE**						
			Containers	Preservatives	Analysis				
			3 x 40mL VOAs	HCl	SSPL VOCs				
			3 x 40mL VOAs	None	Methane, Ethane, Ethene (MEE)				
			3 x 40mL VOAs	H3PO4	TOC				
			1 x 250 mL	HNO_3	Total Iron & Manganese				
			1 x 250 mL	HNO3	Dissolved Iron & Manganese		FIELD FILTER		
			1 x 125 mL	H2SO4	Ammonia, Nitrogen (as N)				
			1 x 250 mL	unpreserved	Orthophosphate-phosphorus, Nitrate, Sulfate				
			1 x 125 mL	ZnAc	Sulfide				

MONITORING WELL RECORD FOR MULTI-VOLUME PURGING

Project Data:

Project Name: Fabracare
Ref. No.: 14918
Date: July 9, 2019
Personnel: D. Brytowski

Monitoring Well Data:

Well No.: **MW-11B**
Pump Type: Geotech Bladder/MP50 or Bailer
Measurement Point: TOC
Constructed Well Depth (ft): NA
Measured Well Depth (ft): 127.3
Depth of Sediment (ft): -
Screen Length (ft): NA
Depth to Pump Intake (ft): -
Well Diameter, D (in): 2
Well Screen Volume, V_s (Gal): 1.60
Initial Depth to Water (ft): 109.42
Total Volume Purged (gal): 4.2

Volume	*Pumping Rate (mL/min)*	*Depth to Water (ft)*	*Drawdown from Initial Water Level (ft)*	*Temperature ^{o}C*	*Conductivity (mS/cm)*	*Turbidity NTU*	*DO (mg/L)*	*pH*	*ORP (mV)*
			Precision Required:	***±3 %***	***±0.005 or 0.01***	***±10 %***	***±10 %***	***±0.1 Units***	***±10 mV***
Begin @ 10:45									
3.00	-	-	-	25.35	0.041	372	10.55	4.5	327
4.20	DRY								
	Sample Time 12:30		**GW-014918-070919-DJB-107**					Fe2+: 1.44	
			Containers	Preservatives	Analysis				
			3 x 40mL VOAs	HCl	SSPL VOCs				
			3 x 40mL VOAs	None	Methane, Ethane, Ethene (MEE)				
			3 x 40mL VOAs	H3PO4	TOC				
			1 x 250 mL	HNO_3	Total Iron & Manganese				
			1 x 250 mL	HNO3	Dissolved Iron & Manganese		FIELD FILTER		
			1 x 125 mL	H2SO4	Ammonia, Nitrogen (as N)				
			1 x 250 mL	unpreserved	Orthophosphate-phosphorus, Nitrate, Sulfate				
			1 x 125 mL	ZnAc	Sulfide				
			950ml filtered		Microbes				
				*****	Dehalococcoides mccartyi microbial analysis by PCR (send to SiREM)				

MONITORING WELL RECORD FOR LOW-FLOW PURGING

Project Data:

Project Name:	Fabracare	Date:	7/9/19 and 7/10/19
Ref. No.:	14918	Personnel:	D. Brytowski

Monitoring Well Data:

Well No.:	**PZ-1**	Screen Length (ft):	7
Pump Type:	Peristaltic	Depth to Pump Intake (ft):	-
Measurement Point:	TOC	Well Diameter, D (in):	1
Constructed Well Depth (ft):	28	Well Screen Volume, V_s (Gal):	-
Measured Well Depth (ft):	26.6	Initial Depth to Water (ft):	25.63
Depth of Sediment (ft):	-	Total Volume Purged (gal):	-

Time	*Pumping Rate (mL/min)*	*Depth to Water (ft)*	*Drawdown from Initial Water Level (ft)*	*Temperature ^{o}C*	*Conductivity (mS/cm)*	*Turbidity NTU*	*DO (mg/L)*	*pH*	*ORP (mV)*
			Precision Required:	***±3 %***	***±0.005 or 0.01***	***±10 %***	***±10 %***	***±0.1 Units***	***±10 mV***
19:30	Purged dry on 7/9/19								
	Sample Time 8:30		**GW-014918-071019-DJB-109**						
			Containers	Preservatives	Analysis				
			3 x 40mL VOAs	HCl	SSPL VOCs				

MONITORING WELL RECORD FOR LOW-FLOW PURGING

Project Data:

Project Name:	Fabracare	Date:	July 9, 2019
Ref. No.:	14918	Personnel:	D. Brytowski

Monitoring Well Data:

Well No.:	**PZ-2R**	Screen Length (ft):	10
Pump Type:	Peristaltic	Depth to Pump Intake (ft):	-
Measurement Point:	TOC	Well Diameter, D (in):	1
Constructed Well Depth (ft):	30.85	Well Screen Volume, V_s (Gal):	0.15
Measured Well Depth (ft):	30.9	Initial Depth to Water (ft):	26.38
Depth of Sediment (ft):	-	Total Volume Purged (gal):	0.75

Volume	*Pumping Rate (mL/min)*	*Depth to Water (ft)*	*Drawdown from Initial Water Level (ft)*	*Temperature ^{o}C*	*Conductivity (mS/cm)*	*Turbidity NTU*	*DO (mg/L)*	*pH*	*ORP (mV)*
			Precision Required:	***±3 %***	***±0.005 or 0.01***	***±10 %***	***±10 %***	***±0.1 Units***	***±10 mV***
0.50	100	28.87	2.49	34.62	0.129	201	2.03	6.03	147
0.75	100	-	-	34.31	0.132	213	1.89	5.91	176
	Sample Time 16:30		**GW-014918-070919-DJB-108**						
			Containers	Preservatives	Analysis				
			3 x 40mL VOAs	HCl	SSPL VOCs				
			3 x 40mL VOAs	None	Methane, Ethane, Ethene (MEE)				
			3 x 40mL VOAs	H3PO4	TOC				
			1 x 250 mL	HNO_3	Total Iron & Manganese				
			1 x 250 mL	HNO3	Dissolved Iron & Manganese		FIELD FILTER		
			1 x 125 mL	H2SO4	Ammonia, Nitrogen (as N)				
			1 x 250 mL	unpreserved	Orthophosphate-phosphorus, Nitrate, Sulfate				
			1 x 125 mL	ZnAc	Sulfide				
			~~3 x 40mL VOAs~~	~~HCl~~	~~1,4 Dioxane~~				

MONITORING WELL RECORD FOR LOW-FLOW PURGING

Project Data:

Project Name: Fabracare
Ref. No.: 14918
Date: July 8, 2019
Personnel: S. Grace

Monitoring Well Data:

Well No.: **RW-1**
Pump Type: Peristaltic
Measurement Point: TOC
Constructed Well Depth (ft): 32.5
Measured Well Depth (ft): 32.25
Depth of Sediment (ft): -
Screen Length (ft): 20
Depth to Pump Intake (ft): 29.5
Well Diameter, D (in): 4
Well Screen Volume, V_s (Gal): 3.83
Initial Depth to Water (ft): 26.36
Total Volume Purged (gal): 1

Time	*Pumping Rate (mL/min)*	*Depth to Water (ft)*	*Drawdown from Initial Water Level (ft)*	*Temperature °C*	*Conductivity (mS/cm)*	*Turbidity NTU*	*DO (mg/L)*	*pH*	*ORP (mV)*
			Precision Required:	***±3 %***	***±0.005 or 0.01***	***±10 %***	***±10 %***	***±0.1 Units***	***±10 mV***
Begin @ 9:27									
9:40	60	26.45	0.09	27.46	0.797	58.9	0.65	6.2	-148
9:45	60	26.48	0.12	27.32	0.798	60.2	0.88	6.29	-152
9:50	60	26.51	0.15	27.29	0.799	62.1	0.92	6.35	-154
9:55	60	26.54	0.18	27.38	0.794	48.5	0.04	6.34	-151
10:00	60	26.57	0.21	27.44	0.789	39.2	0.00	6.33	-150
10:05	60	26.59	0.23	27.59	0.78	27.6	0.00	6.37	-151
10:10	60	26.62	0.26	27.73	0.777	23.5	0.00	6.39	-152
10:15	60	26.65	0.29	28.79	0.774	17.6	0.00	6.38	-151
10:20	60	26.68	0.32	28.81	0.772	18.8	0.00	6.39	-151
	Sample Time 10:25		**GW-014918-070819-SAG-001**						
			Containers	Preservatives	Analysis			Fe2+: 3.30+	
			3 x 40mL VOAs	HCl	SSPL VOCs			D.H. Temp: 23.97	
			3 x 40mL VOAs	None	Methane, Ethane, Ethene (MEE)			.	
			3 x 40mL VOAs	H3PO4	TOC				
			1 x 250 mL	HNO_3	Total Iron & Manganese				
			1 x 250 mL	HNO3	Dissolved Iron & Manganese		FIELD FILTER		
			1 x 125 mL	H2SO4	Ammonia, Nitrogen (as N)				
			1 x 250 mL	unpreserved	Orthophosphate-phosphorus, Nitrate, Sulfate				
			1 x60 ml	unpreserved	GHD met. Acids				
			1 x 125 mL	ZnAc	Sulfide				

MONITORING WELL RECORD FOR LOW-FLOW PURGING

Project Data:

Project Name: Fabracare
Ref. No.: 14918
Date: July 8, 2019
Personnel: S. Grace

Monitoring Well Data:

Well No.: **RW-2**
Pump Type: Peristaltic
Measurement Point: TOC
Constructed Well Depth (ft): 31.5
Measured Well Depth (ft): 30.3
Depth of Sediment (ft): 0.6
Screen Length (ft): 20
Depth to Pump Intake (ft): 28
Well Diameter, D (in): 4
Well Screen Volume, V_s (Gal): 28.00
Initial Depth to Water (ft): 26.03
Total Volume Purged (gal): 2.8

Time	*Pumping Rate (mL/min)*	*Depth to Water (ft)*	*Drawdown from Initial Water Level (ft)*	*Temperature °C*	*Conductivity (mS/cm)*	*Turbidity NTU*	*DO (mg/L)*	*pH*	*ORP (mV)*
			Precision Required:	***±3 %***	***±0.005 or 0.01***	***±10 %***	***±10 %***	***±0.1 Units***	***±10 mV***
Begin @ 11:55									
12:10	50	26.10	0.07	32.29	0.278	91.5	0.00	5.94	-118
12:15	50	26.14	0.11	31.46	0.230	66.7	0.00	5.87	-113
12:20	50	26.16	0.13	30.16	0.219	59.9	0.00	5.82	-110
12:25	50	26.18	0.15	29.96	0.216	37.1	0.00	5.81	-108
12:30	50	26.21	0.18	29.07	0.214	29.5	0.00	5.82	-108
12:35	50	26.23	0.21	28.64	0.213	20.2	0.00	5.78	-107
12:40	50	26.26	0.24	28.21	0.212	19.5	0.00	5.76	-106
12:45	50	26.28	0.26	28.08	0.210	20.4	0.00	5.81	-107
	Sample Time 12:55		**GW-014918-070819-SAG-002**					Fe2+: 3.08	
			Containers	Preservatives	Analysis			D.H. Temp: 29.29	
			3 x 40mL VOAs	HCl	SSPL VOCs				
			3 x 40mL VOAs	None	Methane, Ethane, Ethene (MEE)				
			3 x 40mL VOAs	H3PO4	TOC				
			1 x 250 mL	HNO_3	Total Iron & Manganese				
			1 x 250 mL	HNO3	Dissolved Iron & Manganese		FIELD FILTER		
			1 x 125 mL	H2SO4	Ammonia, Nitrogen (as N)				
			1 x 250 mL	unpreserved	Orthophosphate-phosphorus, Nitrate, Sulfate				
			1 x 60mL	unpreserved	GHD met. Acids				
			SiREM filtered		clogged @ 225 ml filtered				
			1 x 125 mL	ZnAc	Sulfide				
				*****	Dehalococcoides mccartyi microbial analysis by PCR (send to SiREM)				

MONITORING WELL RECORD FOR LOW-FLOW PURGING

Project Data:

Project Name: Fabracare
Ref. No.: 14918
Date: July 9, 2019
Personnel: S. Grace

Monitoring Well Data:

Well No.: **RW-3**
Pump Type: Peristaltic
Measurement Point: TOC
Constructed Well Depth (ft): 31.7
Measured Well Depth (ft): 31.5
Depth of Sediment (ft): -
Screen Length (ft): 20
Depth to Pump Intake (ft): 28
Well Diameter, D (in): 4
Well Screen Volume, V_s (Gal): 3.65
Initial Depth to Water (ft): 25.91
Total Volume Purged (gal): 0.66

Time	*Pumping Rate (mL/min)*	*Depth to Water (ft)*	*Drawdown from Initial Water Level (ft)*	*Temperature °C*	*Conductivity (mS/cm)*	*Turbidity NTU*	*DO (mg/L)*	*pH*	*ORP (mV)*
			Precision Required:	***±3 %***	***±0.005 or 0.01***	***±10 %***	***±10 %***	***±0.1 Units***	***±10 mV***
Begin @ 9:55									
10:15	50	25.97	0.06	32.44	0.203	140	0.00	5.99	-105
10:20	50	26.00	0.09	31.48	0.202	135	0.00	6.01	-104
10:25	50	26.02	0.11	31.50	0.202	127	0.00	6.02	-103
10:30	50	26.04	0.13	31.76	0.2	96.4	0.00	6.01	-102
10:35	50	26.05	0.14	31.95	0.199	86.4	0.00	6.01	-100
10:40	50	26.07	0.16	31.22	0.198	70.2	0.00	6.01	-98
10:45	50	26.08	0.17	31.32	0.197	67.4	0.00	6.01	-97
10:50	50	26.08	0.17	31.26	0.197	68.2	0.00	5.99	-96
10:55	50	26.09	0.18	31.14	0.197	70.9	0.00	5.98	-96
	Sample Time 11:05		**GW-014918-070919-SAG-005**						
			Containers	Preservatives	Analysis			Fe2+: 3.30+	
			3 x 40mL VOAs	HCl	SSPL VOCs			D.H. Temp: 26.06	
			3 x 40mL VOAs	None	Methane, Ethane, Ethene (MEE)				
			3 x 40mL VOAs	H3PO4	TOC				
			1 x 250 mL	HNO_3	Total Iron & Manganese				
			1 x 250 mL	HNO3	Dissolved Iron & Manganese		FIELD FILTER		
			1 x 125 mL	H2SO4	Ammonia, Nitrogen (as N)				
			1 x 250 mL	unpreserved	Orthophosphate-phosphorus, Nitrate, Sulfate				
			1 x 60mL	unpreserved	GHD met. Acids				
			1 x SiRem		1000ml filtered				
			1 x 125 mL	ZnAc	Sulfide				
				*****	Dehalococcoides mccartyi microbial analysis by PCR (send to SiREM)				

MONITORING WELL RECORD FOR LOW-FLOW PURGING

Project Data:

Project Name:	Fabracare	Date:	July 9, 2019
Ref. No.:	14918	Personnel:	S. Grace

Monitoring Well Data:

Well No.:	**RW-4**	Screen Length (ft):	NA
Pump Type:	Peristaltic	Depth to Pump Intake (ft):	29
Measurement Point:	TOC	Well Diameter, D (in):	4
Constructed Well Depth (ft):	NA	Well Screen Volume, V_s (Gal):	4.00
Measured Well Depth (ft):	32.18	Initial Depth to Water (ft):	26.12
Depth of Sediment (ft):	-	Total Volume Purged (gal):	0.66

Time	*Pumping Rate (mL/min)*	*Depth to Water (ft)*	*Drawdown from Initial Water Level (ft)*	*Temperature °C*	*Conductivity (mS/cm)*	*Turbidity NTU*	*DO (mg/L)*	*pH*	*ORP (mV)*
			Precision Required:	***±3 %***	***±0.005 or 0.01***	***±10 %***	***±10 %***	***±0.1 Units***	***±10 mV***
Begin @ 12:13									
12:25	50	26.14	0.02	37.19	0.152	892	0.00	5.49	-7
12:30	50	26.14	0.02	36.32	0.167	684	0.00	5.77	-23
12:35	50	26.15	0.03	35.71	0.168	214	0.00	5.91	-78
12:40	50	26.15	0.03	35.59	0.168	189	0.00	5.99	-109
12:45	50	26.15	0.03	35.57	0.168	124	0.00	5.99	-110
12:50	50	26.16	0.04	35.65	0.168	90.3	0.00	5.98	-111
12:55	50	26.17	0.05	35.72	0.169	36.1	0.00	5.99	-113
13:00	50	26.17	0.05	35.89	0.17	41	0.00	6.01	-115
13:05	50	26.17	0.05	35.91	0.168	39.6	0.00	5.99	-113
	Sample Time 13:15		**GW-014918-070919-SAG-006**					D.H. Temp: 23.54	
			Containers	Preservatives	Analysis				
			3 x 40mL VOAs	HCl	SSPL VOCs				
			3 x 40mL VOAs	None	Methane, Ethane, Ethene (MEE)				
			3 x 40mL VOAs	H3PO4	TOC				
			1 x 250 mL	HNO_3	Total Iron & Manganese				
			1 x 250 mL	HNO3	Dissolved Iron & Manganese		FIELD FILTER		
			1 x 125 mL	H2SO4	Ammonia, Nitrogen (as N)				
			1 x 250 mL	unpreserved	Orthophosphate-phosphorus, Nitrate, Sulfate				
			1 x 125 mL	ZnAc	Sulfide				
			1 x 60 mL	unpreserved	GHD met. Acids				
			1 x SiREM		1000ml filtered				
			~~3 x 40mL VOAs~~	~~HCl~~	~~1,4 Dioxane~~				
				*****	Dehalococcoides mccartyi microbial analysis by PCR (send to SiREM)				

MONITORING WELL RECORD FOR LOW-FLOW PURGING

Project Data:

Project Name: Fabracare
Ref. No.: 14918
Date: July 9, 2019
Personnel: S. Grace

Monitoring Well Data:

Well No.: **RW-5**
Pump Type: Peristaltic
Measurement Point: TOC
Constructed Well Depth (ft): NA
Measured Well Depth (ft): 32.47
Depth of Sediment (ft): -
Screen Length (ft): NA
Depth to Pump Intake (ft): 29.5
Well Diameter, D (in): 4
Well Screen Volume, V_s (Gal): 3.58
Initial Depth to Water (ft): 26.99
Total Volume Purged (gal): 0.7

Time	*Pumping Rate (mL/min)*	*Depth to Water (ft)*	*Drawdown from Initial Water Level (ft)*	*Temperature °C*	*Conductivity (mS/cm)*	*Turbidity NTU*	*DO (mg/L)*	*pH*	*ORP (mV)*
			Precision Required:	***±3 %***	***±0.005 or 0.01***	***±10 %***	***±10 %***	***±0.1 Units***	***±10 mV***
Begin @ 7:57									
8:10	50	27.01	0.02	26.2	0.266	325	0.55	4.79	72
8:15	50	27.01	0.02	25.81	0.327	296	0.00	5.66	-132
8:20	50	27.01	0.02	25.68	0.325	295	0.00	5.69	-134
8:25	50	27.01	0.02	25.62	0.325	291	0.00	5.73	-134
8:30	50	27.01	0.02	25.56	0.324	298	0.00	5.75	-132
8:35	50	27.01	0.02	25.69	0.323	295	0.00	5.69	-127
8:40	50	27.01	0.02	25.76	0.322	290	0.00	5.66	-124
8:45	50	27.01	0.02	25.82	0.321	292	0.00	5.66	-125
8:50	50	27.01	0.02	25.78	0.319	289	0.00	5.65	-124
	Sample Time 9:00		**GW-014918-070919-SAG-004**					Fe2+: 3.30+	
			Containers	Preservatives	Analysis			D.H. Temp: 24.64	
			3 x 40mL VOAs	HCl	SSPL VOCs				
			3 x 40mL VOAs	None	Methane, Ethane, Ethene (MEE)				
			3 x 40mL VOAs	H3PO4	TOC				
			1 x 250 mL	HNO_3	Total Iron & Manganese				
			1 x 250 mL	HNO3	Dissolved Iron & Manganese		FIELD FILTER		
			1 x 125 mL	H2SO4	Ammonia, Nitrogen (as N)				
			1 x 250 mL	unpreserved	Orthophosphate-phosphorus, Nitrate, Sulfate				
			1 x 125 mL	ZnAc	Sulfide				
			1 x 60mL	unpreserved	GHD met. Acids				
			~~3 x 40mL VOAs~~	~~HCl~~	~~1,4 Dioxane~~				

MONITORING WELL RECORD FOR MULTI-VOLUME PURGING

Project Data:

Project Name:	Fabracare	Date:	July 8, 2019
Ref. No.:	14918	Personnel:	D. Brytowski

Monitoring Well Data:

Well No.:	**EPD-1a**	Screen Length (ft):	NA
Pump Type:	Peristaltic / Bailer	Depth to Pump Intake (ft):	30.7
Measurement Point:	TOC	Well Diameter, D (in):	2
Constructed Well Depth (ft):	NA	Well Screen Volume, V_s (Gal):	0.50
Measured Well Depth (ft):	31.02	Initial Depth to Water (ft):	28.1
Depth of Sediment (ft):	-	Total Volume Purged (gal):	1

Volume	*Pumping Rate (mL/min)*	*Depth to Water (ft)*	*Drawdown from Initial Water Level (ft)*	*Temperature °C*	*Conductivity (mS/cm)*	*Turbidity NTU*	*DO (mg/L)*	*pH*	*ORP (mV)*
			Precision Required:	***±3 %***	***±0.005 or 0.01***	***±10 %***	***±10 %***	***±0.1 Units***	***±10 mV***
0.50	-	-	-	20.67	0.105	184	18.80	5.54	249
1.00	-	-	-	20.03	0.111	341	17.43	5.73	258
Dry									
	Sample Time 15:30		**GW-014918-070819-DJB-104**						
			Containers	Preservatives	Analysis				
			3 x 40mL VOAs	HCl	SSPL VOCs				
Approximate 2' water column in 2006									

MONITORING WELL RECORD FOR LOW-FLOW PURGING

Project Data:

Project Name: Fabracare
Ref. No.: 14918
Date: July 8, 2019
Personnel: D. Brytowski

Monitoring Well Data:

Well No.: **EPD-1b**
Pump Type: Geotech Bladder/MP50 or Bailer
Measurement Point: TOC
Constructed Well Depth (ft): NA
Measured Well Depth (ft): 112.21
Depth of Sediment (ft): -
Screen Length (ft): NA
Depth to Pump Intake (ft): -
Well Diameter, D (in): 2
Well Screen Volume, V_s (Gal): 1.60
Initial Depth to Water (ft): 100.29
Total Volume Purged (gal):

Time	*Pumping Rate (mL/min)*	*Depth to Water (ft)*	*Drawdown from Initial Water Level (ft)*	*Temperature °C*	*Conductivity (mS/cm)*	*Turbidity NTU*	*DO (mg/L)*	*pH*	*ORP (mV)*
			Precision Required:	***±3 %***	***±0.005 or 0.01***	***±10 %***	***±10 %***	***±0.1 Units***	***±10 mV***
Begin @ 13:25									
13:45	100	100.63	0.34	28.42	0.115	230	5.81	4.91	270
13:50	100	100.68	0.39	26.45	0.11	210	6.47	4.79	287
13:55	100	100.68	0.39	22.7	0.108	118	6.95	4.71	307
14:00	100	100.68	0.39	22.02	0.113	52.6	6.89	4.63	320
14:05	100	100.68	0.39	21.87	0.114	10.4	6.35	4.6	336
14:10	100	100.66	0.37	21.41	0.115	0.0	6.26	4.51	358
14:15	100	100.68	0.39	21.28	0.116	0.3	6.30	4.49	354
	Sample Time 14:30		**GW-014918-070819-DJB-103**						
			Containers	Preservatives	Analysis				
			3 x 40mL VOAs	HCl	SSPL VOCs				
Historically dry during 2006; 105-110' to water otherwise									

MONITORING WELL RECORD FOR LOW-FLOW PURGING

Project Data:

Project Name:	Fabracare	Date:	July ____, 2019
Ref. No.:	14918	Personnel:	D. Brytowski / S. Grace

Monitoring Well Data:

Well No.:	**EPD-2a**	Screen Length (ft):	NA
Pump Type:	Peristaltic / Bailer	Depth to Pump Intake (ft):	-
Measurement Point:	TOC	Well Diameter, D (in):	2
Constructed Well Depth (ft):	NA	Well Screen Volume, V_s (Gal):	-
Measured Well Depth (ft):	25.8	Initial Depth to Water (ft):	25.59
Depth of Sediment (ft):	-	Total Volume Purged (gal):	-

Time	*Pumping Rate (mL/min)*	*Depth to Water (ft)*	*Drawdown from Initial Water Level (ft)*	*Temperature °C*	*Conductivity (mS/cm)*	*Turbidity NTU*	*DO (mg/L)*	*pH*	*ORP (mV)*
			Precision Required:	***±3 %***	***±0.005 or 0.01***	***±10 %***	***±10 %***	***±0.1 Units***	***±10 mV***
Dry, not sampled									
	Sample Time		**GW-014918- NOT SAMPLED**						
			Containers	Preservatives	Analysis				
			3 x 40mL VOAs	HCl	SSPL VOCs				
Approximate 0.5' water column in 2006									

MONITORING WELL RECORD FOR LOW-FLOW PURGING

Project Data:

Project Name: Fabracare
Ref. No.: 14918
Date: July 8, 2019
Personnel: D. Brytowski

Monitoring Well Data:

Well No.: **EPD-2b**
Pump Type: Geotech Bladder/MP50 or Bailer
Measurement Point: TOC
Constructed Well Depth (ft): NA
Measured Well Depth (ft): 107.9
Depth of Sediment (ft): -
Screen Length (ft): NA
Depth to Pump Intake (ft): 105
Well Diameter, D (in): 2
Well Screen Volume, V_s (Gal): 1.57
Initial Depth to Water (ft): 98.11
Total Volume Purged (gal): 0.8

Time	*Pumping Rate (mL/min)*	*Depth to Water (ft)*	*Drawdown from Initial Water Level (ft)*	*Temperature °C*	*Conductivity (mS/cm)*	*Turbidity NTU*	*DO (mg/L)*	*pH*	*ORP (mV)*
			Precision Required:	***±3 %***	***±0.005 or 0.01***	***±10 %***	***±10 %***	***±0.1 Units***	***±10 mV***
Begin @ 11:15									
11:30	100	98.23	0.12	20.45	0.176	34.3	7.84	5.06	287
11:35	100	98.23	0.12	20.27	0.175	7.2	7.64	4.97	296
11:40	100	98.25	0.14	20.37	0.177	0	7.40	4.9	306
11:45	100	98.25	0.14	20.30	0.178	0	7.21	4.87	310
	Sample Time 11:55/12:00		**GW-014918-070819-DJB-101+102 DUP**						
			Containers	Preservatives	Analysis				
			3 x 40mL VOAs	HCl	SSPL VOCs				
Approximate 10' water column during 2006.									

MONITORING WELL RECORD FOR LOW-FLOW PURGING

Project Data:

Project Name: Fabracare
Ref. No.: 14918
Date: July 9, 2019
Personnel: D. Brytowski

Monitoring Well Data:

Well No.: **EPD-3a**
Pump Type: Peristaltic / Bailer
Measurement Point: TOC
Constructed Well Depth (ft): NA
Measured Well Depth (ft): 30.22
Depth of Sediment (ft): -
Screen Length (ft): NA
Depth to Pump Intake (ft): 29
Well Diameter, D (in): 2
Well Screen Volume, V_s (Gal): 0.50
Initial Depth to Water (ft): 27.21
Total Volume Purged (gal): 1.1

Time	*Pumping Rate (mL/min)*	*Depth to Water (ft)*	*Drawdown from Initial Water Level (ft)*	*Temperature °C*	*Conductivity (mS/cm)*	*Turbidity NTU*	*DO (mg/L)*	*pH*	*ORP (mV)*
			Precision Required:	***±3 %***	***±0.005 or 0.01***	***±10 %***	***±10 %***	***±0.1 Units***	***±10 mV***
Begin @ 9:05									
9:20	100	27.41	0.20	22.07	0.041	182	15.57	4.12	374
9:25	100	27.41	0.20	22.48	0.037	104	7.59	4.04	383
9:30	100	27.43	0.22	22.84	0.034	58.8	4.34	4.00	392
9:35	100	27.45	0.24	23.02	0.032	35.7	3.37	4.99	399
9:40	100	27.45	0.24	23.17	0.03	33.1	3.31	5.01	402
9:45	100	27.45	0.24	23.20	0.03	31.7	3.35	5.05	401
	Sample Time 9:55		**GW-014918-070919-DJB-106**						
			Containers	Preservatives	Analysis				
			3 x 40mL VOAs	HCl	SSPL VOCs				
Approximate 3' water column in 2006									

MONITORING WELL RECORD FOR LOW-FLOW PURGING

Project Data:

Project Name: Fabracare
Ref. No.: 14918
Date: July 9, 2019
Personnel: D. Brytowski

Monitoring Well Data:

Well No.: **EPD-3b**
Pump Type: Geotech Bladder/MP50 or Bailer
Measurement Point: TOC
Constructed Well Depth (ft): NA
Measured Well Depth (ft): 108.05
Depth of Sediment (ft): -
Screen Length (ft): NA
Depth to Pump Intake (ft): 105
Well Diameter, D (in): 2
Well Screen Volume, V_s (Gal): 1.60
Initial Depth to Water (ft): 94.91
Total Volume Purged (gal): 1

Time	*Pumping Rate (mL/min)*	*Depth to Water (ft)*	*Drawdown from Initial Water Level (ft)*	*Temperature °C*	*Conductivity (mS/cm)*	*Turbidity NTU*	*DO (mg/L)*	*pH*	*ORP (mV)*
			Precision Required:	***±3 %***	***±0.005 or 0.01***	***±10 %***	***±10 %***	***±0.1 Units***	***±10 mV***
Begin @ 8:05									
8:20	100	95.17	0.26	19.33	0.056	31.2	4.28	4.48	331
8:25	100	95.19	0.28	19.32	0.053	6.00	3.87	4.43	343
8:30	100	95.18	0.27	19.41	0.053	4.03	3.80	4.39	358
8:35	100	95.20	0.29	19.47	0.053	4.30	3.95	4.17	367
8:40	100	95.18	0.27	19.57	0.053	1.33	3.90	4.28	373
	Sample Time 8:50		**GW-014918-070919-DJB-105 MS/MSD**						
			Containers	Preservatives	Analysis				
			3 x 40mL VOAs	HCl	SSPL VOCs				
Approximately 8' water column during 2006.									

Appendix C
Field Sample Key, Data Validation Memorandum, and Analytical Laboratory Report

Memorandum

August 19, 2019

To:	Terefe Mazengia	Ref. No.:	014918
From:	Chris G. Knight/eew/23-NF	Tel:	512-506-8803
cc:	Paul McMahon		

Subject: **Analytical Results and Reduced Validation**
Semiannual Groundwater Sampling
Fabracare
Fort Valley, Georgia
July 2019

1. Introduction

This document details a reduced validation of analytical results for groundwater samples collected at the Fabracare site during July 2019. Samples were submitted to Pace Analytical Services, LLC. (Pace), located in Peachtree Corners, Georgia. A sample collection and analysis summary is presented in Table 1. The validated analytical results are summarized in Table 2. A summary of the analytical methodology is presented in Table 3.

Standard GHD report deliverables were submitted by the laboratory. The final results and supporting quality assurance/quality control (QA/QC) data were assessed. Evaluation of the data was based on information obtained from the chain of custody forms, finished report forms, method blank data, recovery data from surrogate spikes/laboratory control samples (LCS)/matrix spikes (MS), duplicate data, and field QA/QC samples.

The QA/QC criteria by which these data have been assessed are outlined in the analytical methods referenced in Table 3 and applicable guidance from the documents entitled:

i.) "USEPA National Functional Guidelines for Superfund Organic Methods Data Review", EPA-540-R-2016-002, September 2016.

ii.) "USEPA Contract Laboratory Program National Functional Guidelines for Inorganic Superfund Data Review", EPA 540-R-2016-001, September 2016.

Items i) and ii) will subsequently be referred to as the "Guidelines" in this Memorandum.

2. Sample Holding Time and Preservation

The sample holding time criteria for the analyses are summarized in Table 3. Sample chain of custody documents and the analytical reports were used to determine sample holding times. All samples were prepared and analyzed within the required holding times with the following exception (see Table 4):

i.) GW-014918-070919-DJB-107 was analyzed outside of the established holding time for nitrate (as N). The associated sample result was qualified as estimated.

ii.) The following samples were analyzed outside of the established holding time for orthophosphate as P: GW-014918-070919-SAG-004, GW-014918-070919-SAG-005, GW-014918-070919-SAG-006, GW-014918-070919-DJB-107, and GW-014918-070919-DJB-108. Associated detected sample results were qualified as estimated; biased low. Associated non-detect sample results were rejected due to gross exceedance (greater than two times) of the holding time.

All samples were properly preserved, delivered on ice, and stored by the laboratory at the required temperature (0-6°C).

3. Laboratory Method Blank Analyses

Method blanks are prepared from a purified matrix and analyzed with investigative samples to determine the existence and magnitude of sample contamination introduced during the analytical procedures.

For this study, laboratory method blanks were analyzed at a minimum frequency of one per twenty investigative samples and/or one per analytical batch.

All method blank results were non-detect, indicating that laboratory contamination was not a factor for this investigation.

4. Surrogate Spike Recoveries

In accordance with the method employed, all samples, blanks, and QC samples analyzed for organics are spiked with surrogate compounds prior to sample analysis. Surrogate recoveries provide a means to evaluate the effects of laboratory performance on individual sample matrices.

All samples submitted for volatile organic compounds (VOCs) determinations were spiked with the appropriate number of surrogate compounds prior to sample analysis.

Surrogate recoveries were assessed against laboratory control limits. All surrogate recoveries met the above criteria with the following exception (see Table 5):

i.) GW-014918-070919-SAG-007 was reported with outlying surrogate recoveries for VOCs analysis. All associated sample results were qualified as estimated.

5. Laboratory Control Sample Analyses

LCS are prepared and analyzed as samples to assess the analytical efficiencies of the methods employed, independent of sample matrix effects. For this study, LCS were analyzed at a minimum frequency of one per twenty investigative samples and/or one per analytical batch.

Organic Analyses

The LCS contained all compounds specified in the methods. All LCS recoveries were within the laboratory control limits, demonstrating acceptable analytical accuracy.

Inorganic Analyses

The LCS contained all analytes of interest. LCS recoveries were assessed per the "Guidelines". All LCS recoveries were within the control limits, demonstrating acceptable analytical accuracy.

6. Matrix Spike Analyses

To evaluate the effects of sample matrices on the preparation process, measurement procedures, and accuracy of a particular analysis, samples are spiked with a known concentration of the analyte of concern and analyzed as MS or MS/matrix spike matrix spike duplicate (MSD) samples. The relative percent difference (RPD) between the MS and MSD is used to assess analytical precision.

MS or MS/MSD analyses were performed as specified in Table 1. The laboratory performed additional MS or MS/MSD on non-site samples. These cannot be used to assess accuracy and/or precision for the site samples.

Organic Analyses

The MS or MS/MSD samples were spiked with all compounds specified in the methods. All percent recoveries and RPD values were within the laboratory control limits, demonstrating acceptable analytical accuracy and precision with the following exception (see Table 6):

i) One MS/MSD was reported with elevated recoveries and/or elevated RPDs for VOCs analysis. Associated non-detect sample results would not be affected by the indicated high bias and/or variability. No further action was required. The detected sample results associated with only elevated RPDs were qualified as estimated. The detected sample result associated with both elevated recoveries and RPD was qualified as estimated; biased high.

Inorganic Analyses

The MS or MS/MSD samples were spiked with the analytes of interest, and the results were evaluated using the "Guidelines". All percent recoveries and/or RPD values were within the control limits, demonstrating acceptable analytical accuracy and precision (where applicable) with the following exceptions (see Table 6):

i) One MS was reported with a low recovery for nitrate (as N) analysis. If only the MS or MSD recovery was outside of control limits, no qualification of the data was performed based on the acceptable recovery of the companion spike and the acceptable RPD. No further action was required

ii) One MS/MSD was reported with low recoveries for orthophosphate as P analysis. All associated sample results were qualified as estimated; biased low.

iii) One MS/MSD was reported with a low recoveries for sulfate analysis. Associated detected sample results were qualified as estimated; biased low. Associated non-detect sample results were rejected due to recoveries less than twenty percent.

7. Duplicate Sample Analyses – Inorganic Analyses

Analytical precision is evaluated based on the analysis of laboratory duplicate samples.

The laboratory performed additional duplicate analyses on non-site samples. These cannot be used to assess precision for the site samples.

8. Field QA/QC Samples

The field QA/QC consisted of two trip blank samples and one field duplicate sample set.

Trip Blank Sample Analysis

To evaluate contamination from sample collection, transportation, storage, and analytical activities, two trip blank samples were submitted to the laboratory for VOCs analysis. All results were non-detect for the compounds of interest.

Field Duplicate Sample Analysis

To assess the analytical and sampling protocol precision, one field duplicate sample set was collected and submitted "blind" to the laboratory, as specified in Table 1. The RPDs associated with these duplicate samples must be less than fifty percent for water samples. If the reported concentration in either the investigative sample or its duplicate is less than five times the reporting limit (RL), the evaluation criterion is one times the RL value.

All field duplicate results were within acceptable agreement, demonstrating acceptable sampling and analytical precision.

9. Analyte Reporting

Non-detect results were presented as non-detect at the RL in Table 2.

All dissolved metals results were less than the total results or were within the normal variability of the method (twenty percent difference).

10. Conclusion

Based on the assessment detailed in the foregoing, the data summarized in Table 2 are acceptable with the specific exceptions and qualifications noted herein.

Table 1

Sample Collection and Analysis Summary
Semiannual Groundwater Sampling
Fabracare
Fort Valley, Georgia
July 2019

					Analysis/Parameters									
Sample Identification	**Location**	**Matrix**	**Collection Date (mm/dd/yyyy)**	**Collection Time (hr:min)**	**VOCs**	**Dissolved Gases**	**Metals**	**Ammonia**	**Nitrate (as N)**	**Orthophosphate**	**Sulfate**	**Sulfide**	**TOC**	**Comments**
GW-014918-070819-SAG-001	RW-1	Water	07/08/2019	10:25	X	X	X	X	X	X	X	X	X	MS or MS/MSD-P
GW-014918-070819-DJB-101	EPD-2b	Water	07/08/2019	11:55	X									MS or MS/MSD-P
GW-014915-070819-DJB-102	EPD-2b	Water	07/08/2019	12:00	X									Field duplicate of EPD-2b
GW-014918-070819-SAG-002	RW-2	Water	07/08/2019	12:55	X	X	X	X	X	X	X	X	X	
GW-014918-070819-DJB-103	EPD-1b	Water	07/08/2019	14:20	X									
GW-014918-070819-SAG-003	MW-1	Water	07/08/2019	14:40	X	X	X	X	X	X	X	X	X	
GW-014919-070819-DJB-104	EPD-1a	Water	07/08/2019	15:20	X									
Trip Blank	-	Water	07/08/2019	-	X									Trip Blank
GW-014918-070919-DJB-105	EPD-3b	Water	07/09/2019	08:50	X									MS or MS/MSD-P
GW-014918-070919-SAG-004	RW-5	Water	07/09/2019	09:00	X	X	X	X	X	X	X	X	X	MS or MS/MSD-P
GW-014918-070919-DJB-106	EPD-3a	Water	07/09/2019	09:55	X									
GW-014918-070919-SAG-005	RW-3	Water	07/09/2019	11:05	X	X	X	X	X	X	X	X	X	
GW-014918-070919-DJB-107	MW-11B	Water	07/09/2019	12:30	X	X	X	X	X	X	X	X	X	MS or MS/MSD-P
GW-014918-070919-SAG-006	RW-4	Water	07/09/2019	13:15	X	X	X	X	X	X	X	X	X	
GW-014918-070919-DJB-108	PZ-2R	Water	07/09/2019	16:30	X	X	X	X	X	X	X	X	X	MS or MS/MSD-P

Table 1

Sample Collection and Analysis Summary
Semiannual Groundwater Sampling
Fabracare
Fort Valley, Georgia
July 2019

Sample Identification	Location	Matrix	Collection Date (mm/dd/yyyy)	Collection Time (hr:min)	Analysis/Parameters								Comments
					VOCs	Dissolved Gases	Metals	Ammonia	Nitrate (as N)	Orthophosphate	Sulfate	Sulfide	TOC	
Trip Blank	-	Water	07/09/2019	-	X									Trip Blank
GW-014918-071019-DJB-109	PZ-1	Water	07/10/2019	08:30	X									
GW-014918-070919-SAG-007	MW-2	Water	07/10/2019	08:40	X									
GW-014918-071019-DJB-110	MW-3	Water	07/10/2019	09:30	X									

Notes:

VOCs	- Volatile Organic Compounds
N	- Nitrogen
TOC	- Total Organic Carbon
MS or MS/MSD-P	- Matrix Spike or Matrix Spike/Matrix Spike Duplicate (partial parameters)

Table 2

Analytical Results Summary
Semiannual Groundwater Sampling
Fabracare
Fort Valley, Georgia
July 2019

Location ID:		EPD-1a	EPD-1b	EPD-2b	EPD-2b	EPD-3a
Sample Name:		GW-014919-070819-DJB-104	GW-014918-070819-DJB-103	GW-014918-070819-DJB-101	GW-014915-070819-DJB-102	GW-014918-070919-DJB-106
Sample Date:		07/08/2019	07/08/2019	07/08/2019	07/08/2019 Duplicate	07/09/2019
Parameters	**Unit**					
Volatile Organic Compounds						
cis-1,2-Dichloroethene	µg/L	1.0 U	22.1	4.4 J	5.0	1.0 U
Tetrachloroethene	µg/L	1.0 U	252	87.8 J+	131	1.0 U
trans-1,2-Dichloroethene	µg/L	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U
Trichloroethene	µg/L	1.0 U	15.5	5.1 J	7.0	1.0 U
Vinyl chloride	µg/L	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U
Dissolved Gases						
Ethane	µg/L	--	--	--	--	--
Ethene	µg/L	--	--	--	--	--
Methane	µg/L	--	--	--	--	--
Metals						
Iron	µg/L	--	--	--	--	--
Iron (dissolved)	µg/L	--	--	--	--	--
Manganese	µg/L	--	--	--	--	--
Manganese (dissolved)	µg/L	--	--	--	--	--
General Chemistry						
Ammonia	mg/L	--	--	--	--	--
Nitrate (as N)	mg/L	--	--	--	--	--
Orthophosphate	mg/L	--	--	--	--	--
Sulfate	mg/L	--	--	--	--	--
Sulfide	mg/L	--	--	--	--	--
TOC	mg/L	--	--	--	--	--

Table 2

Analytical Results Summary
Semiannual Groundwater Sampling
Fabracare
Fort Valley, Georgia
July 2019

Location ID:		EPD-3b	MW-1	MW-2	MW-3
Sample Name:		GW-014918-070919-DJB-105	GW-014918-070819-SAG-003	GW-014918-070919-SAG-007	GW-014918-071019-DJB-110
Sample Date:		07/09/2019	07/08/2019	07/10/2019	07/10/2019
Parameters	**Unit**				
Volatile Organic Compounds					
cis-1,2-Dichloroethene	µg/L	1.0 U	720	1.0 UJ-	1.0 U
Tetrachloroethene	µg/L	24.8	1.0 U	1.0 UJ-	1.0 U
trans-1,2-Dichloroethene	µg/L	1.0 U	1.0 U	1.0 UJ-	1.0 U
Trichloroethene	µg/L	1.0 U	1.6	1.0 UJ-	1.0 U
Vinyl chloride	µg/L	1.0 U	1.9	1.0 UJ-	1.0 U
Dissolved Gases					
Ethane	µg/L	--	10.0 U	--	--
Ethene	µg/L	--	10.0 U	--	--
Methane	µg/L	--	18700	--	--
Metals					
Iron	µg/L	--	122000	--	--
Iron (dissolved)	µg/L	--	122000	--	--
Manganese	µg/L	--	72.9	--	--
Manganese (dissolved)	µg/L	--	74.1	--	--
General Chemistry					
Ammonia	mg/L	--	2.3	--	--
Nitrate (as N)	mg/L	--	0.25 U	--	--
Orthophosphate	mg/L	--	2.5 UJ-	--	--
Sulfate	mg/L	--	1.0 U	--	--
Sulfide	mg/L	--	1.0 U	--	--
TOC	mg/L	--	16.0	--	--

Table 2

Analytical Results Summary
Semiannual Groundwater Sampling
Fabracare
Fort Valley, Georgia
July 2019

Location ID:		MW-11B	PZ-1	PZ-2R	RW-1
Sample Name:		GW-014918-070919-DJB-107	GW-014918-071019-DJB-109	GW-014918-070919-DJB-108	GW-014918-070819-SAG-001
Sample Date:		07/09/2019	07/10/2019	07/09/2019	07/08/2019
Parameters	**Unit**				
Volatile Organic Compounds					
cis-1,2-Dichloroethene	µg/L	25.3	1.0 U	1.0 U	172
Tetrachloroethene	µg/L	135	21.0	37.6	1.0 U
trans-1,2-Dichloroethene	µg/L	1.0 U	1.0 U	1.0 U	1.0 U
Trichloroethene	µg/L	5.3	1.0 U	1.0 U	1.0 U
Vinyl chloride	µg/L	1.0 U	1.0 U	1.0 U	1.2
Dissolved Gases					
Ethane	µg/L	10.0 U	--	10.0 U	10.0 U
Ethene	µg/L	10.0 U	--	10.0 U	10.0 U
Methane	µg/L	10.0 U	--	10.0 U	10500
Metals					
Iron	µg/L	5390	--	511	84100
Iron (dissolved)	µg/L	166	--	100 U	83300
Manganese	µg/L	20.8	--	42.2	86.1
Manganese (dissolved)	µg/L	18.6	--	15.0 U	79.7
General Chemistry					
Ammonia	mg/L	0.20 U	--	0.20 U	45.5
Nitrate (as N)	mg/L	3.2 J-	--	3.6	0.25 U
Orthophosphate	mg/L	R	--	R	2.5 UJ-
Sulfate	mg/L	R	--	66.2 J-	1.0 U
Sulfide	mg/L	1.0 U	--	1.0 U	1.0 U
TOC	mg/L	1.3	--	1.0	586

Table 2

Analytical Results Summary
Semiannual Groundwater Sampling
Fabracare
Fort Valley, Georgia
July 2019

Location ID:		RW-2	RW-3	RW-4	RW-5
Sample Name:		GW-014918-070819-SAG-002	GW-014918-070919-SAG-005	GW-014918-070919-SAG-006	GW-014918-070919-SAG-004
Sample Date:		07/08/2019	07/09/2019	07/09/2019	07/09/2019
Parameters	**Unit**				
Volatile Organic Compounds					
cis-1,2-Dichloroethene	µg/L	877	527	302	668
Tetrachloroethene	µg/L	1.0 U	1.0 U	1.0 U	2.5
trans-1,2-Dichloroethene	µg/L	1.0 U	1.0 U	1.0 U	1.0 U
Trichloroethene	µg/L	1.0 U	1.0 U	1.0 U	2.2
Vinyl chloride	µg/L	5.7	1.3	2.3	5.9
Dissolved Gases					
Ethane	µg/L	20.0 U	10.0 U	10.0 U	10.0 U
Ethene	µg/L	20.0 U	10.0 U	10.0 U	10.0 U
Methane	µg/L	28500	4790	5940	7720
Metals					
Iron	µg/L	72600	55200	71300	55600
Iron (dissolved)	µg/L	44600	55300	72100	56700
Manganese	µg/L	167	102	76.3	159
Manganese (dissolved)	µg/L	62.0	102	77.1	146
General Chemistry					
Ammonia	mg/L	0.42	0.49	0.20 U	13.6
Nitrate (as N)	mg/L	0.25 U	0.25 U	0.25 U	4.5
Orthophosphate	mg/L	0.28 J-	R	R	32.9 J-
Sulfate	mg/L	1.0 U	R	R	7.8 J-
Sulfide	mg/L	1.0 U	1.0 U	1.0 U	1.0 U
TOC	mg/L	10	2.9	3.4	366

Notes:

U - Not detected at the associated reporting limit
J - Estimated concentration
J- - Estimated concentration; biased low
J+ - Estimated concentration; biased high
UJ - Not detected; associated reporting limit is esti
UJ- - Not detected; associated reporting limit is esti
N - Nitrogen
TOC - Total Organic Carbon
"--" - Not Applicable

Table 3

Analytical Methods
Semiannual Groundwater Sampling
Fabracare
Fort Valley, Georgia
July 2019

Parameter	Method	Matrix	Holding Time Collection to Analysis (Days)
VOCs	SW-846 8260B	Water	14
Dissolved Gasses	RSK-175	Water	14
Metals	SW-846 6010D	Water	180
Ammonia	EPA 350.1	Water	28
Nitrate (as N)	SW-846 9056A	Water	48 Hours
Orthophosphorus	SM4500-P-E	Water	48 Hours
Sulfate	SW-846 9056A	Water	28
Sulfide	SM 4500-S2-D	Water	7
TOC	SW-846 9060A	Water	28

Notes:

VOCs - Volatile Organic Compounds
N - Nitrogen
TOC - Total Organic Carbon

Method References:

SW-846 - "Test Methods for Evaluating Solid Waste, Physical/Chemical Methods", SW-846, Third Edition, 1986, with subsequent revisions
RSK - Sample Prep And Calculations For Dissolved Gas Analysis In Water Samples Using A GC Headspace Equilibration Technique , RSKSOP-175, Rev. 0, 8/11/94, USEPA Research Lab
EPA - Referenced from "Methods for Chemical Analysis of Water and Wastes", EPA-600/4-79-020, March 1983 with subsequent revisions.
SM - "Standard Methods for the Examination of Water and Wastewater", 18th Edition, 1992, with subsequent revisions

Table 4

Qualified Sample Results Due to Holding Time Exceedance
Semiannual Groundwater Sampling
Fabracare
Fort Valley, Georgia
July 2019

Parameter	Sample ID	Holding Time (days)	Holding Time Criteria	Analyte	Qualified Sample Results		Units
General Chemistry	GW-014918-070919-DJB-107	3	2	Nitrate (as N)	3.2	J-	mg/L
General Chemistry	GW-014918-070919-SAG-004	6	2	Orthophosphate	32.9	J-	mg/L
	GW-014918-070919-SAG-005	6				R	
	GW-014918-070919-SAG-006	6				R	
	GW-014918-070919-DJB-107	6				R	
	GW-014918-070919-DJB-108	6				R	

Notes:

N - Nitrogen
J- - Estimated concentration; biased low
R - Rejected

Table 5

Qualified Sample Data Due to Outlying of Surrogate Recoveries
Semiannual Groundwater Sampling
Fabracare
Fort Valley, Georgia
July 2019

Parameter	Sample ID	Surrogate	Surrogate % Recovery	Control Limits % Recovery	Analyte	Qualified Result	Units
VOCs	GW-014918-070919-SAG-007	1,2-Dichloroethane-d4	47	81-119	cis-1,2-Dichloroethene	1.0 UJ-	µg/L
		4-Bromofluorobenzene	157	82-120	Tetrachloroethene	1.0 UJ-	µg/L
		Toluene-d8	121	82-109	trans-1,2-Dichloroethene	1.0 UJ-	µg/L
					Trichloroethene	1.0 UJ-	µg/L
					Vinyl chloride	1.0 UJ-	µg/L

Notes:

VOCs - Volatile Organic Compounds
UJ- - Not detected; associated reporting limit is estimated biased low

Table 6

Qualified Sample Results Due to Outlying MS or MS/MSD Results
Semiannual Groundwater Sampling
Fabracare
Fort Valley, Georgia
July 2019

Parameter	Sample ID	Analyte	MS % Recovery	MSD % Recovery	RPD (percent)	Control Limits % Recovery	Control Limits RPD	Qualified Result	Units
VOCs	GW-014918-070819-DJB-101	cis-1,2-Dichloroethene	83	114	29	71-138	16	4.4 J	µg/L
		Tetrachloroethene	134	196	18	36-155	14	87.8 J+	µg/L
		Trichloroethene	78	107	28	61-141	12	5.1 J	µg/L
General Chemistry	GW-014918-070819-SAG-001	Orthophosphate						2.5 UJ-	mg/L
	GW-014918-070819-SAG-002							0.28 J-	mg/L
	GW-014918-070819-SAG-003							2.5 UJ-	mg/L
General Chemistry	GW-014918-070919-SAG-004	Sulfate						7.8 J-	mg/L
	GW-014918-070919-SAG-005							R	
	GW-014918-070919-SAG-006							R	
	GW-014918-070919-DJB-107							R	
	GW-014918-070919-DJB-108							66.2 J-	mg/L

Notes:

MS - Matrix Spike
MSD - Matrix Spike Duplicate
RPD - Relative Percent Difference
J - Estimated concentration
J+ - Estimated concentration; biased high
J- - Estimated concentration; biased low
UJ- - Not detected; associated reporting limit is estimated biased low
R - Rejected

Pace Analytical Services, LLC
110 Technology Parkway
Peachtree Corners, GA 30092
(770)734-4200

July 16, 2019

Kelly Blanchard
GHD
3075 Breckinridge Blvd
Suite 470
Duluth, GA 30096

RE: Project: FabraCare FortValley GA 014918
Pace Project No.: 2620536

Dear Kelly Blanchard:
Enclosed are the analytical results for sample(s) received by the laboratory on July 09, 2019. The results relate only to the samples included in this report. Results reported herein conform to the most current, applicable TNI/NELAC standards and the laboratory's Quality Assurance Manual, where applicable, unless otherwise noted in the body of the report.

If you have any questions concerning this report, please feel free to contact me.

Sincerely,

Betsy McDaniel
betsy.mcdaniel@pacelabs.com
(770)734-4200
Project Manager

Enclosures

cc: Terefe Mazengia, GHD
Paul McMahon, GHD
Rebecca Thornton, Pace Analytical Atlanta

Pace Analytical Services, LLC
110 Technology Parkway
Peachtree Corners, GA 30092
(770)734-4200

CERTIFICATIONS

Project: FabraCare FortValley GA 014918
Pace Project No.: 2620536

Atlanta Certification IDs

110 Technology Parkway Peachtree Corners, GA 30092
Florida DOH Certification #: E87315
Georgia DW Inorganics Certification #: 812
Georgia DW Microbiology Certification #: 812
North Carolina Certification #: 381
South Carolina Certification #: 98011001
Virginia Certification #: 460204

Ormond Beach Certification IDs

8 East Tower Circle, Ormond Beach, FL 32174
Alaska DEC- CS/UST/LUST
Alabama Certification #: 41320
Arizona Certification# AZ0819
Colorado Certification: FL NELAC Reciprocity
Connecticut Certification #: PH-0216
Delaware Certification: FL NELAC Reciprocity
Florida Certification #: E83079
Georgia Certification #: 955
Guam Certification: FL NELAC Reciprocity
Hawaii Certification: FL NELAC Reciprocity
Illinois Certification #: 200068
Indiana Certification: FL NELAC Reciprocity
Kansas Certification #: E-10383
Kentucky Certification #: 90050
Louisiana Certification #: FL NELAC Reciprocity
Louisiana Environmental Certificate #: 05007
Maryland Certification: #346
Michigan Certification #: 9911
Mississippi Certification: FL NELAC Reciprocity
Missouri Certification #: 236
Montana Certification #: Cert 0074
Nebraska Certification: NE-OS-28-14
New Hampshire Certification #: 2958
New Jersey Certification #: FL022
New York Certification #: 11608
North Carolina Environmental Certificate #: 667
North Carolina Certification #: 12710
North Dakota Certification #: R-216
Oklahoma Certification #: D9947
Pennsylvania Certification #: 68-00547
Puerto Rico Certification #: FL01264
South Carolina Certification: #96042001
Tennessee Certification #: TN02974
Texas Certification: FL NELAC Reciprocity
US Virgin Islands Certification: FL NELAC Reciprocity
Virginia Environmental Certification #: 460165
West Virginia Certification #: 9962C
Wisconsin Certification #: 399079670
Wyoming (EPA Region 8): FL NELAC Reciprocity

Charlotte Certification IDs

9800 Kincey Ave. Ste 100, Huntersville, NC 28078
Louisiana/NELAP Certification # LA170028
North Carolina Drinking Water Certification #: 37706
North Carolina Field Services Certification #: 5342
North Carolina Wastewater Certification #: 12
South Carolina Certification #: 99006001
Florida/NELAP Certification #: E87627
Kentucky UST Certification #: 84
Virginia/VELAP Certification #: 460221

REPORT OF LABORATORY ANALYSIS

Pace Analytical Services, LLC
110 Technology Parkway
Peachtree Corners, GA 30092
(770)734-4200

SAMPLE SUMMARY

Project: FabraCare FortValley GA 014918
Pace Project No.: 2620536

Lab ID	Sample ID	Matrix	Date Collected	Date Received
2620536001	**GW-014918-070819-DJB-101**	Water	07/08/19 11:55	07/09/19 09:45
2620536002	**GW-014915-070819-DJB-102**	Water	07/08/19 12:00	07/09/19 09:45
2620536003	**GW-014918-070819-DJB-103**	Water	07/08/19 14:20	07/09/19 09:45
2620536004	**GW-014919-070819-DJB-104**	Water	07/08/19 15:20	07/09/19 09:45
2620536005	**GW-014918-070819-SAG-001**	Water	07/08/19 10:25	07/09/19 09:45
2620536006	**GW-014918-070819-SAG-002**	Water	07/08/19 12:55	07/09/19 09:45
2620536007	**GW-014918-070819-SAG-003**	Water	07/08/19 14:40	07/09/19 09:45
2620536008	**Trip Blank**	Water	07/08/19 00:00	07/09/19 09:45

Pace Analytical Services, LLC
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SAMPLE ANALYTE COUNT

Project: FabraCare FortValley GA 014918
Pace Project No.: 2620536

Lab ID	Sample ID	Method	Analysts	Analytes Reported	Laboratory
2620536001	**GW-014918-070819-DJB-101**	EPA 8260B	LIH	9	PASI-GA
2620536002	**GW-014915-070819-DJB-102**	EPA 8260B	LIH	9	PASI-GA
2620536003	**GW-014918-070819-DJB-103**	EPA 8260B	LIH	9	PASI-GA
2620536004	**GW-014919-070819-DJB-104**	EPA 8260B	LIH	9	PASI-GA
2620536005	**GW-014918-070819-SAG-001**	RSK 175 Modified	LMB	3	PASI-C
		EPA 6010D	KLH	2	PASI-GA
		EPA 6010D	KLH	2	PASI-GA
		EPA 8260B	LIH	9	PASI-GA
		SM 4500-P	MWB	1	PASI-GA
		SM 4500-S2 D	KN	1	PASI-GA
		EPA 350.1	ANB	1	PASI-GA
		SM 5310B	SA1	1	PASI-O
		EPA 9056A	MWB	1	PASI-GA
		EPA 9056A	MWB	1	PASI-GA
2620536006	**GW-014918-070819-SAG-002**	RSK 175 Modified	LMB	3	PASI-C
		EPA 6010D	KLH	2	PASI-GA
		EPA 6010D	KLH	2	PASI-GA
		EPA 8260B	LIH	9	PASI-GA
		SM 4500-P	MWB	1	PASI-GA
		SM 4500-S2 D	KN	1	PASI-GA
		EPA 350.1	ANB	1	PASI-GA
		SM 5310B	SA1	1	PASI-O
		EPA 9056A	MWB	1	PASI-GA
		EPA 9056A	MWB	1	PASI-GA
2620536007	**GW-014918-070819-SAG-003**	RSK 175 Modified	LMB	3	PASI-C
		EPA 6010D	AAP, KLH	2	PASI-GA
		EPA 6010D	AAP, KLH	2	PASI-GA
		EPA 8260B	LIH	9	PASI-GA
		SM 4500-P	MWB	1	PASI-GA
		SM 4500-S2 D	KN	1	PASI-GA
		EPA 350.1	ANB	1	PASI-GA
		SM 5310B	SA1	1	PASI-O
		EPA 9056A	MWB	1	PASI-GA
		EPA 9056A	MWB	1	PASI-GA
2620536008	**Trip Blank**	EPA 8260B	LIH	9	PASI-GA

REPORT OF LABORATORY ANALYSIS

Pace Analytical Services, LLC
110 Technology Parkway
Peachtree Corners, GA 30092
(770)734-4200

ANALYTICAL RESULTS

Project: FabraCare FortValley GA 014918
Pace Project No.: 2620536

Sample: GW-014918-070819-DJB-101 **Lab ID: 2620536001** Collected: 07/08/19 11:55 Received: 07/09/19 09:45 Matrix: Water

Parameters	Results	Units	Report Limit	DF	Prepared	Analyzed	CAS No.	Qual
8260B MSV	Analytical Method: EPA 8260B							
cis-1,2-Dichloroethene	**4.4**	ug/L	1.0	1		07/09/19 16:53	156-59-2	R1
trans-1,2-Dichloroethene	ND	ug/L	1.0	1		07/09/19 16:53	156-60-5	R1
Tetrachloroethene	**87.8**	ug/L	1.0	1		07/09/19 16:53	127-18-4	M3,R1
Trichloroethene	**5.1**	ug/L	1.0	1		07/09/19 16:53	79-01-6	R1
Vinyl chloride	ND	ug/L	1.0	1		07/09/19 16:53	75-01-4	R1
Surrogates								
1,2-Dichloroethane-d4 (S)	99	%.	81-119	1		07/09/19 16:53	17060-07-0	
Dibromofluoromethane (S)	93	%.	82-114	1		07/09/19 16:53	1868-53-7	
4-Bromofluorobenzene (S)	102	%.	82-120	1		07/09/19 16:53	460-00-4	
Toluene-d8 (S)	106	%.	82-109	1		07/09/19 16:53	2037-26-5	

REPORT OF LABORATORY ANALYSIS

Pace Analytical Services, LLC
110 Technology Parkway
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ANALYTICAL RESULTS

Project: FabraCare FortValley GA 014918
Pace Project No.: 2620536

Sample: GW-014915-070819-DJB-102 **Lab ID: 2620536002** Collected: 07/08/19 12:00 Received: 07/09/19 09:45 Matrix: Water

Parameters	Results	Units	Report Limit	DF	Prepared	Analyzed	CAS No.	Qual
8260B MSV	Analytical Method: EPA 8260B							
cis-1,2-Dichloroethene	**5.0**	ug/L	1.0	1		07/09/19 17:19	156-59-2	
trans-1,2-Dichloroethene	ND	ug/L	1.0	1		07/09/19 17:19	156-60-5	
Tetrachloroethene	**131**	ug/L	1.0	1		07/09/19 17:19	127-18-4	
Trichloroethene	**7.0**	ug/L	1.0	1		07/09/19 17:19	79-01-6	
Vinyl chloride	ND	ug/L	1.0	1		07/09/19 17:19	75-01-4	
Surrogates								
1,2-Dichloroethane-d4 (S)	98	%.	81-119	1		07/09/19 17:19	17060-07-0	
Dibromofluoromethane (S)	96	%.	82-114	1		07/09/19 17:19	1868-53-7	
4-Bromofluorobenzene (S)	99	%.	82-120	1		07/09/19 17:19	460-00-4	
Toluene-d8 (S)	105	%.	82-109	1		07/09/19 17:19	2037-26-5	

REPORT OF LABORATORY ANALYSIS

Pace Analytical Services, LLC
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ANALYTICAL RESULTS

Project: FabraCare FortValley GA 014918
Pace Project No.: 2620536

Sample: GW-014918-070819-DJB-103 **Lab ID: 2620536003** Collected: 07/08/19 14:20 Received: 07/09/19 09:45 Matrix: Water

Parameters	Results	Units	Report Limit	DF	Prepared	Analyzed	CAS No.	Qual
8260B MSV	Analytical Method: EPA 8260B							
cis-1,2-Dichloroethene	**22.1**	ug/L	1.0	1		07/09/19 17:45	156-59-2	
trans-1,2-Dichloroethene	ND	ug/L	1.0	1		07/09/19 17:45	156-60-5	
Tetrachloroethene	**252**	ug/L	10.0	10		07/11/19 12:42	127-18-4	
Trichloroethene	**15.5**	ug/L	1.0	1		07/09/19 17:45	79-01-6	
Vinyl chloride	ND	ug/L	1.0	1		07/09/19 17:45	75-01-4	
Surrogates								
1,2-Dichloroethane-d4 (S)	94	%.	81-119	1		07/09/19 17:45	17060-07-0	
Dibromofluoromethane (S)	91	%.	82-114	1		07/09/19 17:45	1868-53-7	
4-Bromofluorobenzene (S)	99	%.	82-120	1		07/09/19 17:45	460-00-4	
Toluene-d8 (S)	108	%.	82-109	1		07/09/19 17:45	2037-26-5	

REPORT OF LABORATORY ANALYSIS

Pace Analytical Services, LLC
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Peachtree Corners, GA 30092
(770)734-4200

ANALYTICAL RESULTS

Project: FabraCare FortValley GA 014918
Pace Project No.: 2620536

Sample: GW-014919-070819-DJB-104 **Lab ID: 2620536004** Collected: 07/08/19 15:20 Received: 07/09/19 09:45 Matrix: Water

Parameters	Results	Units	Report Limit	DF	Prepared	Analyzed	CAS No.	Qual
8260B MSV	Analytical Method: EPA 8260B							
cis-1,2-Dichloroethene	ND	ug/L	1.0	1		07/09/19 18:11	156-59-2	
trans-1,2-Dichloroethene	ND	ug/L	1.0	1		07/09/19 18:11	156-60-5	
Tetrachloroethene	ND	ug/L	1.0	1		07/09/19 18:11	127-18-4	
Trichloroethene	ND	ug/L	1.0	1		07/09/19 18:11	79-01-6	
Vinyl chloride	ND	ug/L	1.0	1		07/09/19 18:11	75-01-4	
Surrogates								
1,2-Dichloroethane-d4 (S)	100	%.	81-119	1		07/09/19 18:11	17060-07-0	
Dibromofluoromethane (S)	93	%.	82-114	1		07/09/19 18:11	1868-53-7	
4-Bromofluorobenzene (S)	102	%.	82-120	1		07/09/19 18:11	460-00-4	
Toluene-d8 (S)	106	%.	82-109	1		07/09/19 18:11	2037-26-5	

REPORT OF LABORATORY ANALYSIS

Pace Analytical Services, LLC
110 Technology Parkway
Peachtree Corners, GA 30092
(770)734-4200

ANALYTICAL RESULTS

Project: FabraCare FortValley GA 014918
Pace Project No.: 2620536

Sample: GW-014918-070819-SAG-001 **Lab ID: 2620536005** Collected: 07/08/19 10:25 Received: 07/09/19 09:45 Matrix: Water

Parameters	Results	Units	Report Limit	DF	Prepared	Analyzed	CAS No.	Qual
RSK 175 Headspace	Analytical Method: RSK 175 Modified							
Ethane	ND	ug/L	10.0	1		07/10/19 17:29	74-84-0	
Ethene	ND	ug/L	10.0	1		07/10/19 17:29	74-85-1	
Methane	**10500**	ug/L	10.0	1		07/10/19 17:29	74-82-8	
6010D MET ICP	Analytical Method: EPA 6010D Preparation Method: EPA 3010A							
Iron	**84100**	ug/L	100	1	07/11/19 13:21	07/12/19 18:26	7439-89-6	
Manganese	**86.1**	ug/L	15.0	1	07/11/19 13:21	07/12/19 18:26	7439-96-5	
6010D MET ICP Dissolved	Analytical Method: EPA 6010D Preparation Method: EPA 3010A							
Iron, Dissolved	**83300**	ug/L	100	1	07/11/19 13:35	07/12/19 21:22	7439-89-6	
Manganese, Dissolved	**79.7**	ug/L	15.0	1	07/11/19 13:35	07/12/19 21:22	7439-96-5	
8260B MSV	Analytical Method: EPA 8260B							
cis-1,2-Dichloroethene	**172**	ug/L	10.0	10		07/11/19 13:08	156-59-2	
trans-1,2-Dichloroethene	ND	ug/L	1.0	1		07/09/19 18:37	156-60-5	
Tetrachloroethene	ND	ug/L	1.0	1		07/09/19 18:37	127-18-4	
Trichloroethene	ND	ug/L	1.0	1		07/09/19 18:37	79-01-6	
Vinyl chloride	**1.2**	ug/L	1.0	1		07/09/19 18:37	75-01-4	
Surrogates								
1,2-Dichloroethane-d4 (S)	100	%.	81-119	1		07/09/19 18:37	17060-07-0	
Dibromofluoromethane (S)	96	%.	82-114	1		07/09/19 18:37	1868-53-7	
4-Bromofluorobenzene (S)	104	%.	82-120	1		07/09/19 18:37	460-00-4	
Toluene-d8 (S)	104	%.	82-109	1		07/09/19 18:37	2037-26-5	
4500PE Ortho Phosphorus	Analytical Method: SM 4500-P							
Orthophosphate as P	ND	mg/L	2.5	10		07/09/19 20:51		M6
4500S2D Sulfide Water	Analytical Method: SM 4500-S2 D							
Sulfide	ND	mg/L	1.0	1		07/12/19 09:30	18496-25-8	
350.1 Ammonia	Analytical Method: EPA 350.1							
Nitrogen, Ammonia	**45.5**	mg/L	2.0	10		07/11/19 14:14	7664-41-7	
5310B TOC	Analytical Method: SM 5310B							
Total Organic Carbon	**586**	mg/L	20.0	20		07/16/19 00:14	7440-44-0	
9056 IC Anions 48hr	Analytical Method: EPA 9056A							
Nitrate as N	ND	mg/L	0.25	1		07/10/19 03:00	14797-55-8	
9056 IC Anions	Analytical Method: EPA 9056A							
Sulfate	ND	mg/L	1.0	1		07/16/19 04:38	14808-79-8	

REPORT OF LABORATORY ANALYSIS

Pace Analytical Services, LLC
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Peachtree Corners, GA 30092
(770)734-4200

ANALYTICAL RESULTS

Project: FabraCare FortValley GA 014918
Pace Project No.: 2620536

Sample: GW-014918-070819-SAG-002 **Lab ID: 2620536006** Collected: 07/08/19 12:55 Received: 07/09/19 09:45 Matrix: Water

Parameters	Results	Units	Report Limit	DF	Prepared	Analyzed	CAS No.	Qual
RSK 175 Headspace	Analytical Method: RSK 175 Modified							
Ethane	ND	ug/L	20.0	2		07/10/19 17:44	74-84-0	
Ethene	ND	ug/L	20.0	2		07/10/19 17:44	74-85-1	
Methane	**28500**	ug/L	20.0	2		07/10/19 17:44	74-82-8	
6010D MET ICP	Analytical Method: EPA 6010D Preparation Method: EPA 3010A							
Iron	**72600**	ug/L	100	1	07/11/19 13:21	07/12/19 18:32	7439-89-6	
Manganese	**167**	ug/L	15.0	1	07/11/19 13:21	07/12/19 18:32	7439-96-5	
6010D MET ICP Dissolved	Analytical Method: EPA 6010D Preparation Method: EPA 3010A							
Iron, Dissolved	**44600**	ug/L	100	1	07/11/19 13:35	07/12/19 21:27	7439-89-6	
Manganese, Dissolved	**62.0**	ug/L	15.0	1	07/11/19 13:35	07/12/19 21:27	7439-96-5	
8260B MSV	Analytical Method: EPA 8260B							
cis-1,2-Dichloroethene	**877**	ug/L	10.0	10		07/11/19 13:34	156-59-2	
trans-1,2-Dichloroethene	ND	ug/L	1.0	1		07/09/19 19:03	156-60-5	
Tetrachloroethene	ND	ug/L	1.0	1		07/09/19 19:03	127-18-4	
Trichloroethene	ND	ug/L	1.0	1		07/09/19 19:03	79-01-6	
Vinyl chloride	**5.7**	ug/L	1.0	1		07/09/19 19:03	75-01-4	
Surrogates								
1,2-Dichloroethane-d4 (S)	98	%.	81-119	1		07/09/19 19:03	17060-07-0	
Dibromofluoromethane (S)	96	%.	82-114	1		07/09/19 19:03	1868-53-7	
4-Bromofluorobenzene (S)	105	%.	82-120	1		07/09/19 19:03	460-00-4	
Toluene-d8 (S)	105	%.	82-109	1		07/09/19 19:03	2037-26-5	
4500PE Ortho Phosphorus	Analytical Method: SM 4500-P							
Orthophosphate as P	**0.28**	mg/L	0.25	1		07/09/19 20:52		
4500S2D Sulfide Water	Analytical Method: SM 4500-S2 D							
Sulfide	ND	mg/L	1.0	1		07/12/19 09:30	18496-25-8	
350.1 Ammonia	Analytical Method: EPA 350.1							
Nitrogen, Ammonia	**0.42**	mg/L	0.20	1		07/11/19 13:40	7664-41-7	
5310B TOC	Analytical Method: SM 5310B							
Total Organic Carbon	**10**	mg/L	1.0	1		07/16/19 00:29	7440-44-0	
9056 IC Anions 48hr	Analytical Method: EPA 9056A							
Nitrate as N	ND	mg/L	0.25	1		07/10/19 04:08	14797-55-8	
9056 IC Anions	Analytical Method: EPA 9056A							
Sulfate	ND	mg/L	1.0	1		07/16/19 05:00	14808-79-8	

REPORT OF LABORATORY ANALYSIS

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ANALYTICAL RESULTS

Project: FabraCare FortValley GA 014918
Pace Project No.: 2620536

Sample: GW-014918-070819-SAG-003 **Lab ID: 2620536007** Collected: 07/08/19 14:40 Received: 07/09/19 09:45 Matrix: Water

Parameters	Results	Units	Report Limit	DF	Prepared	Analyzed	CAS No.	Qual
RSK 175 Headspace	Analytical Method: RSK 175 Modified							
Ethane	ND	ug/L	10.0	1		07/10/19 17:13	74-84-0	
Ethene	ND	ug/L	10.0	1		07/10/19 17:13	74-85-1	
Methane	**18700**	ug/L	10.0	1		07/10/19 17:13	74-82-8	
6010D MET ICP	Analytical Method: EPA 6010D Preparation Method: EPA 3010A							
Iron	**122000**	ug/L	1000	10	07/11/19 13:21	07/15/19 12:41	7439-89-6	
Manganese	**72.9**	ug/L	15.0	1	07/11/19 13:21	07/12/19 18:37	7439-96-5	
6010D MET ICP Dissolved	Analytical Method: EPA 6010D Preparation Method: EPA 3010A							
Iron, Dissolved	**122000**	ug/L	1000	10	07/11/19 13:35	07/15/19 12:36	7439-89-6	
Manganese, Dissolved	**74.1**	ug/L	15.0	1	07/11/19 13:35	07/12/19 21:32	7439-96-5	
8260B MSV	Analytical Method: EPA 8260B							
cis-1,2-Dichloroethene	**720**	ug/L	10.0	10		07/11/19 14:00	156-59-2	
trans-1,2-Dichloroethene	ND	ug/L	1.0	1		07/09/19 19:29	156-60-5	
Tetrachloroethene	ND	ug/L	1.0	1		07/09/19 19:29	127-18-4	
Trichloroethene	**1.6**	ug/L	1.0	1		07/09/19 19:29	79-01-6	
Vinyl chloride	**1.9**	ug/L	1.0	1		07/09/19 19:29	75-01-4	
Surrogates								
1,2-Dichloroethane-d4 (S)	100	%.	81-119	1		07/09/19 19:29	17060-07-0	
Dibromofluoromethane (S)	96	%.	82-114	1		07/09/19 19:29	1868-53-7	
4-Bromofluorobenzene (S)	102	%.	82-120	1		07/09/19 19:29	460-00-4	
Toluene-d8 (S)	101	%.	82-109	1		07/09/19 19:29	2037-26-5	
4500PE Ortho Phosphorus	Analytical Method: SM 4500-P							
Orthophosphate as P	ND	mg/L	2.5	10		07/09/19 20:53		
4500S2D Sulfide Water	Analytical Method: SM 4500-S2 D							
Sulfide	ND	mg/L	1.0	1		07/12/19 09:31	18496-25-8	
350.1 Ammonia	Analytical Method: EPA 350.1							
Nitrogen, Ammonia	**2.3**	mg/L	0.20	1		07/11/19 13:41	7664-41-7	
5310B TOC	Analytical Method: SM 5310B							
Total Organic Carbon	**16.0**	mg/L	1.0	1		07/16/19 00:41	7440-44-0	
9056 IC Anions 48hr	Analytical Method: EPA 9056A							
Nitrate as N	ND	mg/L	0.25	1		07/10/19 04:31	14797-55-8	
9056 IC Anions	Analytical Method: EPA 9056A							
Sulfate	ND	mg/L	1.0	1		07/16/19 05:23	14808-79-8	

REPORT OF LABORATORY ANALYSIS

Pace Analytical Services, LLC
110 Technology Parkway
Peachtree Corners, GA 30092
(770)734-4200

ANALYTICAL RESULTS

Project: FabraCare FortValley GA 014918
Pace Project No.: 2620536

Sample: Trip Blank **Lab ID: 2620536008** Collected: 07/08/19 00:00 Received: 07/09/19 09:45 Matrix: Water

Parameters	Results	Units	Report Limit	DF	Prepared	Analyzed	CAS No.	Qual
8260B MSV	Analytical Method: EPA 8260B							
cis-1,2-Dichloroethene	ND	ug/L	1.0	1		07/11/19 12:16	156-59-2	
trans-1,2-Dichloroethene	ND	ug/L	1.0	1		07/11/19 12:16	156-60-5	
Tetrachloroethene	ND	ug/L	1.0	1		07/11/19 12:16	127-18-4	
Trichloroethene	ND	ug/L	1.0	1		07/11/19 12:16	79-01-6	
Vinyl chloride	ND	ug/L	1.0	1		07/11/19 12:16	75-01-4	
Surrogates								
1,2-Dichloroethane-d4 (S)	90	%.	81-119	1		07/11/19 12:16	17060-07-0	
Dibromofluoromethane (S)	90	%.	82-114	1		07/11/19 12:16	1868-53-7	
4-Bromofluorobenzene (S)	104	%.	82-120	1		07/11/19 12:16	460-00-4	
Toluene-d8 (S)	103	%.	82-109	1		07/11/19 12:16	2037-26-5	

REPORT OF LABORATORY ANALYSIS

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QUALITY CONTROL DATA

Project: FabraCare FortValley GA 014918
Pace Project No.: 2620536

QC Batch: 485642 Analysis Method: RSK 175 Modified
QC Batch Method: RSK 175 Modified Analysis Description: RSK 175 HEADSPACE
Associated Lab Samples: 2620536005, 2620536006, 2620536007

METHOD BLANK: 2622902 Matrix: Water
Associated Lab Samples: 2620536005, 2620536006, 2620536007

Parameter	Units	Blank Result	Reporting Limit	Analyzed	Qualifiers
Ethane	ug/L	ND	10.0	07/10/19 12:23	
Ethene	ug/L	ND	10.0	07/10/19 12:23	
Methane	ug/L	ND	10.0	07/10/19 12:23	

LABORATORY CONTROL SAMPLE: 2622903

Parameter	Units	Spike Conc.	LCS Result	LCS % Rec	% Rec Limits	Qualifiers
Ethane	ug/L	658	725	110	70-130	
Ethene	ug/L	1120	1220	108	70-130	
Methane	ug/L	396	459	116	70-130	

MATRIX SPIKE SAMPLE: 2622923

Parameter	Units	92435939002 Result	Spike Conc.	MS Result	MS % Rec	% Rec Limits	Qualifiers
Ethane	ug/L	ND	658	723	110	70-130	
Ethene	ug/L	ND	1120	1380	123	70-130	
Methane	ug/L	33.8	396	496	117	70-130	

SAMPLE DUPLICATE: 2622904

Parameter	Units	92435939001 Result	Dup Result	RPD	Max RPD	Qualifiers
Ethane	ug/L	ND	ND		20	
Ethene	ug/L	ND	ND		20	
Methane	ug/L	129	143	11	20	

SAMPLE DUPLICATE: 2622924

Parameter	Units	92436072001 Result	Dup Result	RPD	Max RPD	Qualifiers
Ethane	ug/L	1.2J	ND		20	
Ethene	ug/L	2.8J	2.4J		20	
Methane	ug/L	178	191	7	20	

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QUALITY CONTROL DATA

Project: FabraCare FortValley GA 014918
Pace Project No.: 2620536

QC Batch: 31653 Analysis Method: EPA 6010D
QC Batch Method: EPA 3010A Analysis Description: 6010D MET
Associated Lab Samples: 2620536005, 2620536006, 2620536007

METHOD BLANK: 142378 Matrix: Water
Associated Lab Samples: 2620536005, 2620536006, 2620536007

Parameter	Units	Blank Result	Reporting Limit	Analyzed	Qualifiers
Iron	ug/L	ND	100	07/12/19 18:16	
Manganese	ug/L	ND	15.0	07/12/19 18:16	

LABORATORY CONTROL SAMPLE: 142379

Parameter	Units	Spike Conc.	LCS Result	LCS % Rec	% Rec Limits	Qualifiers
Iron	ug/L	1000	952	95	80-120	
Manganese	ug/L	1000	961	96	80-120	

MATRIX SPIKE & MATRIX SPIKE DUPLICATE: 142380 142381

Parameter	Units	2620642001 Result	MS Spike Conc.	MSD Spike Conc.	MS Result	MSD Result	MS % Rec	MSD % Rec	% Rec Limits	RPD	Max RPD	Qual
Iron	ug/L	61.6	1000	1000	987	1060	92	99	75-125	7	20	
Manganese	ug/L	ND	1000	1000	935	963	93	96	75-125	3	20	

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REPORT OF LABORATORY ANALYSIS

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QUALITY CONTROL DATA

Project: FabraCare FortValley GA 014918
Pace Project No.: 2620536

QC Batch: 31652 Analysis Method: EPA 6010D
QC Batch Method: EPA 3010A Analysis Description: 6010D MET Dissolved
Associated Lab Samples: 2620536005, 2620536006, 2620536007

METHOD BLANK: 142374 Matrix: Water
Associated Lab Samples: 2620536005, 2620536006, 2620536007

Parameter	Units	Blank Result	Reporting Limit	Analyzed	Qualifiers
Iron, Dissolved	ug/L	ND	100	07/12/19 21:11	
Manganese, Dissolved	ug/L	ND	15.0	07/12/19 21:11	

LABORATORY CONTROL SAMPLE: 142375

Parameter	Units	Spike Conc.	LCS Result	LCS % Rec	% Rec Limits	Qualifiers
Iron, Dissolved	ug/L	1000	981	98	80-120	
Manganese, Dissolved	ug/L	1000	1010	101	80-120	

MATRIX SPIKE & MATRIX SPIKE DUPLICATE: 142376 142377

Parameter	Units	2620646007 Result	MS Spike Conc.	MSD Spike Conc.	MS Result	MSD Result	MS % Rec	MSD % Rec	% Rec Limits	RPD	Max RPD	Qual
Iron, Dissolved	ug/L	166	1000	1000	1190	1160	102	99	75-125	3	20	
Manganese, Dissolved	ug/L	18.6	1000	1000	1040	1020	102	100	75-125	2	20	

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REPORT OF LABORATORY ANALYSIS

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QUALITY CONTROL DATA

Project: FabraCare FortValley GA 014918
Pace Project No.: 2620536

QC Batch: 31539 Analysis Method: EPA 8260B
QC Batch Method: EPA 8260B Analysis Description: 8260B MSV
Associated Lab Samples: 2620536001, 2620536002, 2620536003, 2620536004, 2620536005, 2620536006, 2620536007, 2620536008

METHOD BLANK: 141710 Matrix: Water
Associated Lab Samples: 2620536001, 2620536002, 2620536003, 2620536004, 2620536005, 2620536006, 2620536007, 2620536008

Parameter	Units	Blank Result	Reporting Limit	Analyzed	Qualifiers
cis-1,2-Dichloroethene	ug/L	ND	1.0	07/09/19 10:48	
Tetrachloroethene	ug/L	ND	1.0	07/09/19 10:48	
trans-1,2-Dichloroethene	ug/L	ND	1.0	07/09/19 10:48	
Trichloroethene	ug/L	ND	1.0	07/09/19 10:48	
Vinyl chloride	ug/L	ND	1.0	07/09/19 10:48	
1,2-Dichloroethane-d4 (S)	%.	97	81-119	07/09/19 10:48	
4-Bromofluorobenzene (S)	%.	105	82-120	07/09/19 10:48	
Dibromofluoromethane (S)	%.	90	82-114	07/09/19 10:48	
Toluene-d8 (S)	%.	105	82-109	07/09/19 10:48	

LABORATORY CONTROL SAMPLE: 141711

Parameter	Units	Spike Conc.	LCS Result	LCS % Rec	% Rec Limits	Qualifiers
cis-1,2-Dichloroethene	ug/L	50	48.9	98	74-131	
Tetrachloroethene	ug/L	50	51.0	102	51-139	
trans-1,2-Dichloroethene	ug/L	50	48.0	96	69-144	
Trichloroethene	ug/L	50	42.6	85	73-126	
Vinyl chloride	ug/L	50	41.6	83	50-133	
1,2-Dichloroethane-d4 (S)	%.			95	81-119	
4-Bromofluorobenzene (S)	%.			105	82-120	
Dibromofluoromethane (S)	%.			100	82-114	
Toluene-d8 (S)	%.			105	82-109	

MATRIX SPIKE & MATRIX SPIKE DUPLICATE: 141712 141713

Parameter	Units	2620536001 Result	MS Spike Conc.	MSD Spike Conc.	MS Result	MSD Result	MS % Rec	MSD % Rec	% Rec Limits	RPD	Max RPD	Qual
cis-1,2-Dichloroethene	ug/L	4.4	50	50	45.9	61.6	83	114	71-138	29	16	R1
Tetrachloroethene	ug/L	87.8	50	50	155	186	134	196	36-155	18	14	M3,R1
trans-1,2-Dichloroethene	ug/L	ND	50	50	41.8	58.6	84	117	61-152	34	14	R1
Trichloroethene	ug/L	5.1	50	50	44.2	58.6	78	107	61-141	28	12	R1
Vinyl chloride	ug/L	ND	50	50	41.9	60.0	84	120	22-156	35	26	R1
1,2-Dichloroethane-d4 (S)	%.						99	100	81-119			
4-Bromofluorobenzene (S)	%.						102	103	82-120			
Dibromofluoromethane (S)	%.						97	106	82-114			
Toluene-d8 (S)	%.						106	105	82-109			

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QUALITY CONTROL DATA

Project: FabraCare FortValley GA 014918
Pace Project No.: 2620536

QC Batch: 31562 Analysis Method: SM 4500-P
QC Batch Method: SM 4500-P Analysis Description: 4500PE Ortho Phosphorus
Associated Lab Samples: 2620536005, 2620536006, 2620536007

METHOD BLANK: 141842 Matrix: Water
Associated Lab Samples: 2620536005, 2620536006, 2620536007

Parameter	Units	Blank Result	Reporting Limit	Analyzed	Qualifiers
Orthophosphate as P	mg/L	ND	0.25	07/09/19 20:49	

LABORATORY CONTROL SAMPLE: 141843

Parameter	Units	Spike Conc.	LCS Result	LCS % Rec	% Rec Limits	Qualifiers
Orthophosphate as P	mg/L	0.5	0.54	107	80-120	

MATRIX SPIKE & MATRIX SPIKE DUPLICATE: 141844 141845

Parameter	Units	2620536005 Result	MS Spike Conc.	MSD Spike Conc.	MS Result	MSD Result	MS % Rec	MSD % Rec	% Rec Limits	RPD	Max RPD	Qual
Orthophosphate as P	mg/L	ND	5	5	3.3	3.4	61	62	80-120	1	10	M6

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QUALITY CONTROL DATA

Project: FabraCare FortValley GA 014918
Pace Project No.: 2620536

QC Batch: 31696 Analysis Method: SM 4500-S2 D
QC Batch Method: SM 4500-S2 D Analysis Description: 4500S2D Sulfide Water
Associated Lab Samples: 2620536005, 2620536006, 2620536007

METHOD BLANK: 142632 Matrix: Water
Associated Lab Samples: 2620536005, 2620536006, 2620536007

Parameter	Units	Blank Result	Reporting Limit	Analyzed	Qualifiers
Sulfide	mg/L	ND	1.0	07/12/19 09:28	

LABORATORY CONTROL SAMPLE: 142633

Parameter	Units	Spike Conc.	LCS Result	LCS % Rec	% Rec Limits	Qualifiers
Sulfide	mg/L	0.5	.51J	102	80-120	

MATRIX SPIKE & MATRIX SPIKE DUPLICATE: 142640 142641

Parameter	Units	2620653018 Result	MS Spike Conc.	MSD Spike Conc.	MS Result	MSD Result	MS % Rec	MSD % Rec	% Rec Limits	RPD	Max RPD	Qual
Sulfide	mg/L	ND	0.5	0.5	.52J	.51J	104	103	30-129	1	10	

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QUALITY CONTROL DATA

Project: FabraCare FortValley GA 014918
Pace Project No.: 2620536

QC Batch: 31612 Analysis Method: EPA 350.1
QC Batch Method: EPA 350.1 Analysis Description: 350.1 Ammonia
Associated Lab Samples: 2620536005, 2620536006, 2620536007

METHOD BLANK: 142087 Matrix: Water
Associated Lab Samples: 2620536005, 2620536006, 2620536007

Parameter	Units	Blank Result	Reporting Limit	Analyzed	Qualifiers
Nitrogen, Ammonia	mg/L	ND	0.20	07/11/19 13:28	

LABORATORY CONTROL SAMPLE: 142088

Parameter	Units	Spike Conc.	LCS Result	LCS % Rec	% Rec Limits	Qualifiers
Nitrogen, Ammonia	mg/L	10	10.2	102	90-110	

MATRIX SPIKE SAMPLE: 142089

Parameter	Units	2620529002 Result	Spike Conc.	MS Result	MS % Rec	% Rec Limits	Qualifiers
Nitrogen, Ammonia	mg/L	0.26	10	10.3	100	90-110	

MATRIX SPIKE SAMPLE: 142090

Parameter	Units	2620575002 Result	Spike Conc.	MS Result	MS % Rec	% Rec Limits	Qualifiers
Nitrogen, Ammonia	mg/L	ND	10	10.2	102	90-110	

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QUALITY CONTROL DATA

Project: FabraCare FortValley GA 014918
Pace Project No.: 2620536

QC Batch: 553733 Analysis Method: SM 5310B
QC Batch Method: SM 5310B Analysis Description: 5310B TOC
Associated Lab Samples: 2620536005, 2620536006, 2620536007

METHOD BLANK: 3004111 Matrix: Water
Associated Lab Samples: 2620536005, 2620536006, 2620536007

Parameter	Units	Blank Result	Reporting Limit	Analyzed	Qualifiers
Total Organic Carbon	mg/L	ND	1.0	07/15/19 19:32	

LABORATORY CONTROL SAMPLE: 3004115

Parameter	Units	Spike Conc.	LCS Result	LCS % Rec	% Rec Limits	Qualifiers
Total Organic Carbon	mg/L	20	19.3	97	90-110	

MATRIX SPIKE & MATRIX SPIKE DUPLICATE: 3004116 3004117

Parameter	Units	35480355001 Result	MS Spike Conc.	MSD Spike Conc.	MS Result	MSD Result	MS % Rec	MSD % Rec	% Rec Limits	RPD	Max RPD	Qual
Total Organic Carbon	mg/L	10.6	20	20	29.1	28.8	92	91	80-120	1	20	

MATRIX SPIKE & MATRIX SPIKE DUPLICATE: 3004118 3004119

Parameter	Units	92435336002 Result	MS Spike Conc.	MSD Spike Conc.	MS Result	MSD Result	MS % Rec	MSD % Rec	% Rec Limits	RPD	Max RPD	Qual
Total Organic Carbon	mg/L	2.4	20	20	21.0	21.3	93	95	80-120	2	20	

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QUALITY CONTROL DATA

Project: FabraCare FortValley GA 014918
Pace Project No.: 2620536

QC Batch: 31560 Analysis Method: EPA 9056A
QC Batch Method: EPA 9056A Analysis Description: 9056 IC Anions
Associated Lab Samples: 2620536005, 2620536006, 2620536007

METHOD BLANK: 141834 Matrix: Water
Associated Lab Samples: 2620536005, 2620536006, 2620536007

Parameter	Units	Blank Result	Reporting Limit	Analyzed	Qualifiers
Nitrate as N	mg/L	ND	0.25	07/10/19 02:15	

LABORATORY CONTROL SAMPLE: 141835

Parameter	Units	Spike Conc.	LCS Result	LCS % Rec	% Rec Limits	Qualifiers
Nitrate as N	mg/L	10	10.5	105	90-110	

MATRIX SPIKE & MATRIX SPIKE DUPLICATE: 141836 141837

Parameter	Units	2620536005 Result	MS Spike Conc.	MSD Spike Conc.	MS Result	MSD Result	MS % Rec	MSD % Rec	% Rec Limits	RPD	Max RPD	Qual
Nitrate as N	mg/L	ND	10	10	10.3	10.2	102	100	90-110	1	15	

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QUALITY CONTROL DATA

Project: FabraCare FortValley GA 014918
Pace Project No.: 2620536

QC Batch: 31836 Analysis Method: EPA 9056A
QC Batch Method: EPA 9056A Analysis Description: 9056 IC Anions
Associated Lab Samples: 2620536005, 2620536006, 2620536007

METHOD BLANK: 143235 Matrix: Water
Associated Lab Samples: 2620536005, 2620536006, 2620536007

Parameter	Units	Blank Result	Reporting Limit	Analyzed	Qualifiers
Sulfate	mg/L	ND	1.0	07/16/19 01:37	

LABORATORY CONTROL SAMPLE: 143236

Parameter	Units	Spike Conc.	LCS Result	LCS % Rec	% Rec Limits	Qualifiers
Sulfate	mg/L	10	10.1	101	90-110	

MATRIX SPIKE & MATRIX SPIKE DUPLICATE: 143237 143238

Parameter	Units	2620492001 Result	MS Spike Conc.	MSD Spike Conc.	MS Result	MSD Result	MS % Rec	MSD % Rec	% Rec Limits	RPD	Max RPD	Qual
Sulfate	mg/L	ND	10	10	12.4	12.6	96	98	90-110	2	15	

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QUALIFIERS

Project: FabraCare FortValley GA 014918
Pace Project No.: 2620536

DEFINITIONS

DF - Dilution Factor, if reported, represents the factor applied to the reported data due to dilution of the sample aliquot.

ND - Not Detected at or above adjusted reporting limit.

J - Estimated concentration above the adjusted method detection limit and below the adjusted reporting limit.

MDL - Adjusted Method Detection Limit.

PQL - Practical Quantitation Limit.

RL - Reporting Limit - The lowest concentration value that meets project requirements for quantitative data with known precision and bias for a specific analyte in a specific matrix.

S - Surrogate

1,2-Diphenylhydrazine decomposes to and cannot be separated from Azobenzene using Method 8270. The result for each analyte is a combined concentration.

Consistent with EPA guidelines, unrounded data are displayed and have been used to calculate % recovery and RPD values.

LCS(D) - Laboratory Control Sample (Duplicate)

MS(D) - Matrix Spike (Duplicate)

DUP - Sample Duplicate

RPD - Relative Percent Difference

NC - Not Calculable.

SG - Silica Gel - Clean-Up

U - Indicates the compound was analyzed for, but not detected.

N-Nitrosodiphenylamine decomposes and cannot be separated from Diphenylamine using Method 8270. The result reported for each analyte is a combined concentration.

Pace Analytical is TNI accredited. Contact your Pace PM for the current list of accredited analytes.

TNI - The NELAC Institute.

LABORATORIES

PASI-C	Pace Analytical Services - Charlotte
PASI-GA	Pace Analytical Services - Atlanta, GA
PASI-O	Pace Analytical Services - Ormond Beach

ANALYTE QUALIFIERS

M3	Matrix spike recovery was outside laboratory control limits due to matrix interferences.
M6	Matrix spike and Matrix spike duplicate recovery not evaluated against control limits due to sample dilution.
R1	RPD value was outside control limits.

Pace Analytical Services, LLC
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QUALITY CONTROL DATA CROSS REFERENCE TABLE

Project: FabraCare FortValley GA 014918
Pace Project No.: 2620536

Lab ID	Sample ID	QC Batch Method	QC Batch	Analytical Method	Analytical Batch
2620536005	**GW-014918-070819-SAG-001**	RSK 175 Modified	485642		
2620536006	**GW-014918-070819-SAG-002**	RSK 175 Modified	485642		
2620536007	**GW-014918-070819-SAG-003**	RSK 175 Modified	485642		
2620536005	**GW-014918-070819-SAG-001**	EPA 3010A	31653	EPA 6010D	31664
2620536006	**GW-014918-070819-SAG-002**	EPA 3010A	31653	EPA 6010D	31664
2620536007	**GW-014918-070819-SAG-003**	EPA 3010A	31653	EPA 6010D	31664
2620536005	**GW-014918-070819-SAG-001**	EPA 3010A	31652	EPA 6010D	31663
2620536006	**GW-014918-070819-SAG-002**	EPA 3010A	31652	EPA 6010D	31663
2620536007	**GW-014918-070819-SAG-003**	EPA 3010A	31652	EPA 6010D	31663
2620536001	**GW-014918-070819-DJB-101**	EPA 8260B	31539		
2620536002	**GW-014915-070819-DJB-102**	EPA 8260B	31539		
2620536003	**GW-014918-070819-DJB-103**	EPA 8260B	31539		
2620536004	**GW-014919-070819-DJB-104**	EPA 8260B	31539		
2620536005	**GW-014918-070819-SAG-001**	EPA 8260B	31539		
2620536006	**GW-014918-070819-SAG-002**	EPA 8260B	31539		
2620536007	**GW-014918-070819-SAG-003**	EPA 8260B	31539		
2620536008	**Trip Blank**	EPA 8260B	31539		
2620536005	**GW-014918-070819-SAG-001**	SM 4500-P	31562		
2620536006	**GW-014918-070819-SAG-002**	SM 4500-P	31562		
2620536007	**GW-014918-070819-SAG-003**	SM 4500-P	31562		
2620536005	**GW-014918-070819-SAG-001**	SM 4500-S2 D	31696		
2620536006	**GW-014918-070819-SAG-002**	SM 4500-S2 D	31696		
2620536007	**GW-014918-070819-SAG-003**	SM 4500-S2 D	31696		
2620536005	**GW-014918-070819-SAG-001**	EPA 350.1	31612		
2620536006	**GW-014918-070819-SAG-002**	EPA 350.1	31612		
2620536007	**GW-014918-070819-SAG-003**	EPA 350.1	31612		
2620536005	**GW-014918-070819-SAG-001**	SM 5310B	553733		
2620536006	**GW-014918-070819-SAG-002**	SM 5310B	553733		
2620536007	**GW-014918-070819-SAG-003**	SM 5310B	553733		
2620536005	**GW-014918-070819-SAG-001**	EPA 9056A	31560		
2620536006	**GW-014918-070819-SAG-002**	EPA 9056A	31560		
2620536007	**GW-014918-070819-SAG-003**	EPA 9056A	31560		
2620536005	**GW-014918-070819-SAG-001**	EPA 9056A	31836		
2620536006	**GW-014918-070819-SAG-002**	EPA 9056A	31836		
2620536007	**GW-014918-070819-SAG-003**	EPA 9056A	31836		

CHAIN-OF-CUSTODY / Analytical Request Document

The Chain-of-Custody is a LEGAL DOCUMENT. All relevant fields must be completed accurately.

Page : 1 Of 1

Section A Required Client Information:	Section B Required Project Information:	Section C Invoice Information:
Company: GHD	Report To: Kelly Blanchard	Attention:
Address: 3075 Breckinridge Blvd	Copy To: See SSOW	Company Name:
Duluth, GA 30096	SSOW # 014919 - QSF024	Address:
Email: kelly.blanchard@ghd.com, terrie.mcmanigle@ghd.com	Purchase Order #:	Pace Quote:
Phone: (770)441-0027 Fax:	Project Name: FabraCare Fort Valley GA	Pace Project Manager: betsy.mcdaniel@pacelabs.com,
Requested Due Date:	Project #: 014918	Pace Profile #: 1681

Regulatory Agency

State / Location: GA

ITEM #	SAMPLE ID (One Character per box. (A-Z, 0-9 / , -) Sample Ids must be unique)	MATRIX CODE (see valid codes to left)	SAMPLE TYPE (G=GRAB C=COMP)	COLLECTED START DATE	COLLECTED START TIME	COLLECTED END DATE	COLLECTED END TIME	SAMPLE TEMP AT COLLECTION	# OF CONTAINERS	Preservatives: Unpreserved	H2SO4	HNO3	HCl	NaOH	Na2S2O3	Methanol	Other 2n Ac	Analysis Test Y/N	VOC by 8260	1,4-Dioxane by 8260	Metals (Fe, Mn)	Dissolved Metals by 6010 (F,F)	ammonia	Ortho Phosphorus (F.C.)	Nitrate, Sulfate	Total Organic Carbon	Methane, Ethane, and Ether	Sulfide	Trip BLANK	Residual Chlorine (Y/N)	
1	~~MW-1~~ GW-014918-070819-DJB-101	WT		7/31/19			11:55		3				3						X		X	X	X	X	X	X	X	X		1
2	~~MW-2~~ GW-014918-070819-DJB-102	WT		↓			12:01		3				3						X		X	X	X	X	X	X	X	X		2
3	~~MW-3~~ GW-014918-070819-DJB-103	WT		↓			14:20		3				3						X		X	X	X	X	X	X	X	X		3
4	~~MW-5R~~ GW-014918-070819-DJB-104	WT		7/8/19			15:30		3				3						X		X	X	X	X	X	X	X	X		4
5	~~MW-11B~~ GW-014918-070819-SAG-001	WT		7/8/19			1025		15	4	2	2	5				2		X		X	X	X	X	X	X	X	X	RW-1	5
6	~~RW-1~~ GW-014918-070819-SAG-002	WT		↓			1155		15	4	2	2	5				2		X		X	X	X	X	X	X	X	X	RW-2	6
7	~~RW-2~~ GW-014918-070819-SAG-003	WT		↓			1440		15	4	2	2	5				2		X		X	X	X	X	X	X	X	X	MW-1	7
8	RW-3	WT																	X		X	X	X	X	X	X	X	X		8
9	RW-4	WT																	X		X	X	X	X	X	X	X	X		
10	RW-5	WT																	X		X	X	X	X	X	X	X	X		
11	PZ-1	WT																	X		X	X	X	X	X	X	X	X		
12	PZ-2R	WT																	X		X	X	X	X	X	X	X	X		

ADDITIONAL COMMENTS	RELINQUISHED BY / AFFILIATION	DATE	TIME	ACCEPTED BY / AFFILIATION	DATE	TIME	SAMPLE CONDITIONS: TEMP in C	Received on Ice (Y/N)	Custody Sealed Cooler (Y/N)	Samples Intact (Y/N)
See SSOW		7/8/19	1700		7/9/19	0945	2.3	Y	N	Y

SAMPLER NAME AND SIGNATURE

PRINT Name of SAMPLER: Steven Grace

SIGNATURE of SAMPLER: DATE Signed: 7/8/19

WO# : 2620536

2620536

Face Analytical

Sample Condition Upon Recei **WO# : 2620536**

Client Name: GHD

PM: BM **Due Date: 07/16/19**

CLIENT: GHD

Courier: ☑ Fed Ex ☐ UPS ☐ USPS ☐ Client ☐ Commercial ☐ Pace Other _____

Tracking #: 788348041630

Custody Seal on Cooler/Box Present: ☐ yes ☑ no Seals intact: ☐ yes ☐ no

Optional
Proj. Due Date:
Proj. Name:

Packing Material: ☐ Bubble Wrap ☑ Bubble Bags ☐ None ☐ Other _____

Thermometer Used 082

Type of Ice: (We) Blue None ☐ Samples on ice, cooling process has begun

Cooler Temperature 2.3°C

Biological Tissue is Frozen: Yes No

Date and Initials of person examining contents: 7/9/19 CH

Temp should be above freezing to 6°C

		Comments:
Chain of Custody Present:	☑Yes ☐No ☐N/A	1.
Chain of Custody Filled Out:	☑Yes ☐No ☐N/A	2.
Chain of Custody Relinquished:	☑Yes ☐No ☐N/A	3.
Sampler Name & Signature on COC:	☑Yes ☐No ☐N/A	4.
Samples Arrived within Hold Time:	☑Yes ☐No ☐N/A	5.
Short Hold Time Analysis (<72hr):	☑Yes ☐No ☐N/A	6.
Rush Turn Around Time Requested:	☐Yes ☑No ☐N/A	7.
Sufficient Volume:	☑Yes ☐No ☐N/A	8.
Correct Containers Used:	☑Yes ☐No ☐N/A	9.
-Pace Containers Used:	☑Yes ☐No ☐N/A	
Containers Intact:	☑Yes ☐No ☐N/A	10.
Filtered volume received for Dissolved tests	☑Yes ☐No ☐N/A	11. Diss-Mets field filtered Ortho-phos not field filtered
Sample Labels match COC:	☑Yes ☐No ☐N/A	12.
-Includes date/time/ID/Analysis Matrix: W		
All containers needing preservation have been checked.	☑Yes ☐No ☐N/A	13.
All containers needing preservation are found to be in compliance with EPA recommendation.	☑Yes ☐No ☐N/A	
exceptions: VOA, coliform, TOC, O&G, WI-DRO (water)	☑Yes ☐No	Initial when completed / Lot # of added preservative
Samples checked for dechlorination:	☐Yes ☐No ☑N/A	14.
Headspace in VOA Vials (>6mm):	☐Yes ☑No ☐N/A	15.
Trip Blank Present:	☐Yes ☐No ☐N/A	16. Trip Blank present but not listed on COC
Trip Blank Custody Seals Present	☐Yes ☐No ☐N/A	
Pace Trip Blank Lot # (if purchased):		

Client Notification/ Resolution: Field Data Required? Y / N

Person Contacted: _____ Date/Time: _____

Comments/ Resolution: _____

Project Manager Review: _____ **Date:** _____

Note: Whenever there is a discrepancy affecting North Carolina compliance samples, a copy of this form will be sent to the North Carolina DEHNR Certification Office (i.e out of hold, incorrect preservative, out of temp, incorrect containers)

Pace Analytical Services, LLC
110 Technology Parkway
Peachtree Corners, GA 30092
(770)734-4200

July 19, 2019

Terefe Mazengia
GHD
3075 Breckinridge Blvd
Suite 470
Duluth, GA 30096

RE: Project: FabraCare Fort Valley GA
Pace Project No.: 2620646

Dear Terefe Mazengia:
Enclosed are the analytical results for sample(s) received by the laboratory on July 10, 2019. The results relate only to the samples included in this report. Results reported herein conform to the most current, applicable TNI/NELAC standards and the laboratory's Quality Assurance Manual, where applicable, unless otherwise noted in the body of the report.

The original analysis of the samples had results over the calibration range for samples -009 and -010. Reanalysis of the samples at a dilution did not confirm the hits.

If you have any questions concerning this report, please feel free to contact me.

Sincerely,

Betsy McDaniel
betsy.mcdaniel@pacelabs.com
(770)734-4200
Project Manager

Enclosures

cc: Paul McMahon, GHD
Rebecca Thornton, Pace Analytical Atlanta

Pace Analytical Services, LLC
110 Technology Parkway
Peachtree Corners, GA 30092
(770)734-4200

CERTIFICATIONS

Project: FabraCare Fort Valley GA
Pace Project No.: 2620646

Atlanta Certification IDs

110 Technology Parkway Peachtree Corners, GA 30092
Florida DOH Certification #: E87315
Georgia DW Inorganics Certification #: 812
Georgia DW Microbiology Certification #: 812
North Carolina Certification #: 381
South Carolina Certification #: 98011001
Virginia Certification #: 460204

Ormond Beach Certification IDs

8 East Tower Circle, Ormond Beach, FL 32174
Alaska DEC- CS/UST/LUST
Alabama Certification #: 41320
Arizona Certification# AZ0819
Colorado Certification: FL NELAC Reciprocity
Connecticut Certification #: PH-0216
Delaware Certification: FL NELAC Reciprocity
Florida Certification #: E83079
Georgia Certification #: 955
Guam Certification: FL NELAC Reciprocity
Hawaii Certification: FL NELAC Reciprocity
Illinois Certification #: 200068
Indiana Certification: FL NELAC Reciprocity
Kansas Certification #: E-10383
Kentucky Certification #: 90050
Louisiana Certification #: FL NELAC Reciprocity
Louisiana Environmental Certificate #: 05007
Maryland Certification: #346
Michigan Certification #: 9911
Mississippi Certification: FL NELAC Reciprocity
Missouri Certification #: 236
Montana Certification #: Cert 0074
Nebraska Certification: NE-OS-28-14
New Hampshire Certification #: 2958
New Jersey Certification #: FL022
New York Certification #: 11608
North Carolina Environmental Certificate #: 667
North Carolina Certification #: 12710
North Dakota Certification #: R-216
Oklahoma Certification #: D9947
Pennsylvania Certification #: 68-00547
Puerto Rico Certification #: FL01264
South Carolina Certification: #96042001
Tennessee Certification #: TN02974
Texas Certification: FL NELAC Reciprocity
US Virgin Islands Certification: FL NELAC Reciprocity
Virginia Environmental Certification #: 460165
West Virginia Certification #: 9962C
Wisconsin Certification #: 399079670
Wyoming (EPA Region 8): FL NELAC Reciprocity

Charlotte Certification IDs

9800 Kincey Ave. Ste 100, Huntersville, NC 28078
Louisiana/NELAP Certification # LA170028
North Carolina Drinking Water Certification #: 37706
North Carolina Field Services Certification #: 5342
North Carolina Wastewater Certification #: 12
South Carolina Certification #: 99006001
Florida/NELAP Certification #: E87627
Kentucky UST Certification #: 84
Virginia/VELAP Certification #: 460221

REPORT OF LABORATORY ANALYSIS

Pace Analytical Services, LLC
110 Technology Parkway
Peachtree Corners, GA 30092
(770)734-4200

SAMPLE SUMMARY

Project: FabraCare Fort Valley GA
Pace Project No.: 2620646

Lab ID	Sample ID	Matrix	Date Collected	Date Received
2620646001	**GW-014918-070919-SAG-004**	Water	07/09/19 09:00	07/10/19 13:40
2620646002	**GW-014918-070919-SAG-005**	Water	07/09/19 11:05	07/10/19 13:40
2620646003	**GW-014918-070919-SAG-006**	Water	07/09/19 13:15	07/10/19 13:40
2620646004	**GW-014918-070919-SAG-007**	Water	07/10/19 08:40	07/10/19 13:40
2620646005	**GW-014918-070919-DJB-105**	Water	07/09/19 08:50	07/10/19 13:40
2620646006	**GW-014918-070919-DJB-106**	Water	07/09/19 09:55	07/10/19 13:40
2620646007	**GW-014918-070919-DJB-107**	Water	07/09/19 12:30	07/10/19 13:40
2620646008	**GW-014918-070919-DJB-108**	Water	07/09/19 16:30	07/10/19 13:40
2620646009	**GW-014918-071019-DJB-109**	Water	07/10/19 08:30	07/10/19 13:40
2620646010	**GW-014918-071019-DJB-110**	Water	07/10/19 09:30	07/10/19 13:40
2620646011	**Trip Blank**	Water	07/09/19 00:00	07/10/19 13:40

Pace Analytical Services, LLC
110 Technology Parkway
Peachtree Corners, GA 30092
(770)734-4200

SAMPLE ANALYTE COUNT

Project: FabraCare Fort Valley GA
Pace Project No.: 2620646

Lab ID	Sample ID	Method	Analysts	Analytes Reported	Laboratory
2620646001	**GW-014918-070919-SAG-004**	RSK 175 Modified	LMB	3	PASI-C
		EPA 6010D	KLH	2	PASI-GA
		EPA 6010D	KLH	2	PASI-GA
		EPA 8260B	LIH	9	PASI-GA
		SM 4500-P	MWB	1	PASI-GA
		SM 4500-S2 D	KN	1	PASI-GA
		EPA 350.1	ANB	1	PASI-GA
		SM 5310B	SA1	1	PASI-O
		EPA 9056A	MWB	1	PASI-GA
		EPA 9056A	MWB	1	PASI-GA
2620646002	**GW-014918-070919-SAG-005**	RSK 175 Modified	LMB	3	PASI-C
		EPA 6010D	KLH	2	PASI-GA
		EPA 6010D	KLH	2	PASI-GA
		EPA 8260B	LIH	9	PASI-GA
		SM 4500-P	MWB	1	PASI-GA
		SM 4500-S2 D	KN	1	PASI-GA
		EPA 350.1	ANB	1	PASI-GA
		SM 5310B	SA1	1	PASI-O
		EPA 9056A	MWB	1	PASI-GA
		EPA 9056A	MWB	1	PASI-GA
2620646003	**GW-014918-070919-SAG-006**	RSK 175 Modified	LMB	3	PASI-C
		EPA 6010D	KLH	2	PASI-GA
		EPA 6010D	KLH	2	PASI-GA
		EPA 8260B	LIH	9	PASI-GA
		SM 4500-P	MWB	1	PASI-GA
		SM 4500-S2 D	KN	1	PASI-GA
		EPA 350.1	ANB	1	PASI-GA
		SM 5310B	SA1	1	PASI-O
		EPA 9056A	MWB	1	PASI-GA
		EPA 9056A	MWB	1	PASI-GA
2620646004	**GW-014918-070919-SAG-007**	EPA 8260B	LIH	9	PASI-GA
2620646005	**GW-014918-070919-DJB-105**	EPA 8260B	LIH	9	PASI-GA
2620646006	**GW-014918-070919-DJB-106**	EPA 8260B	LIH	9	PASI-GA
2620646007	**GW-014918-070919-DJB-107**	RSK 175 Modified	LMB	3	PASI-C
		EPA 6010D	KLH	2	PASI-GA
		EPA 6010D	KLH	2	PASI-GA
		EPA 8260B	LIH	9	PASI-GA

REPORT OF LABORATORY ANALYSIS

Pace Analytical Services, LLC
110 Technology Parkway
Peachtree Corners, GA 30092
(770)734-4200

SAMPLE ANALYTE COUNT

Project: FabraCare Fort Valley GA
Pace Project No.: 2620646

Lab ID	Sample ID	Method	Analysts	Analytes Reported	Laboratory
		SM 4500-P	MWB	1	PASI-GA
		SM 4500-S2 D	KN	1	PASI-GA
		EPA 350.1	ANB	1	PASI-GA
		SM 5310B	SA1	1	PASI-O
		EPA 9056A	MWB	1	PASI-GA
		EPA 9056A	MWB	1	PASI-GA
2620646008	**GW-014918-070919-DJB-108**	RSK 175 Modified	LMB	3	PASI-C
		EPA 6010D	KLH	2	PASI-GA
		EPA 6010D	KLH	2	PASI-GA
		EPA 8260B	LIH	9	PASI-GA
		SM 4500-P	MWB	1	PASI-GA
		SM 4500-S2 D	KN	1	PASI-GA
		EPA 350.1	ANB	1	PASI-GA
		SM 5310B	SA1	1	PASI-O
		EPA 9056A	MWB	1	PASI-GA
		EPA 9056A	MWB	1	PASI-GA
2620646009	**GW-014918-071019-DJB-109**	EPA 8260B	LIH	9	PASI-GA
2620646010	**GW-014918-071019-DJB-110**	EPA 8260B	LIH	9	PASI-GA
2620646011	**Trip Blank**	EPA 8260B	LIH	9	PASI-GA

Pace Analytical Services, LLC
110 Technology Parkway
Peachtree Corners, GA 30092
(770)734-4200

ANALYTICAL RESULTS

Project: FabraCare Fort Valley GA
Pace Project No.: 2620646

Sample: GW-014918-070919-SAG-004 **Lab ID: 2620646001** Collected: 07/09/19 09:00 Received: 07/10/19 13:40 Matrix: Water

Parameters	Results	Units	Report Limit	DF	Prepared	Analyzed	CAS No.	Qual
RSK 175 Headspace	Analytical Method: RSK 175 Modified							
Ethane	ND	ug/L	10.0	1		07/12/19 18:04	74-84-0	
Ethene	ND	ug/L	10.0	1		07/12/19 18:04	74-85-1	
Methane	**7720**	ug/L	10.0	1		07/12/19 18:04	74-82-8	
6010D MET ICP	Analytical Method: EPA 6010D Preparation Method: EPA 3010A							
Iron	**55600**	ug/L	100	1	07/11/19 13:21	07/12/19 18:58	7439-89-6	
Manganese	**159**	ug/L	15.0	1	07/11/19 13:21	07/12/19 18:58	7439-96-5	
6010D MET ICP Dissolved	Analytical Method: EPA 6010D Preparation Method: EPA 3010A							
Iron, Dissolved	**56700**	ug/L	100	1	07/11/19 13:35	07/12/19 21:38	7439-89-6	
Manganese, Dissolved	**146**	ug/L	15.0	1	07/11/19 13:35	07/12/19 21:38	7439-96-5	
8260B MSV	Analytical Method: EPA 8260B							
cis-1,2-Dichloroethene	**668**	ug/L	10.0	10		07/12/19 13:23	156-59-2	
trans-1,2-Dichloroethene	ND	ug/L	1.0	1		07/11/19 14:26	156-60-5	
Tetrachloroethene	**2.5**	ug/L	1.0	1		07/11/19 14:26	127-18-4	
Trichloroethene	**2.2**	ug/L	1.0	1		07/11/19 14:26	79-01-6	
Vinyl chloride	**5.9**	ug/L	1.0	1		07/11/19 14:26	75-01-4	
Surrogates								
1,2-Dichloroethane-d4 (S)	95	%.	81-119	1		07/11/19 14:26	17060-07-0	
Dibromofluoromethane (S)	94	%.	82-114	1		07/11/19 14:26	1868-53-7	
4-Bromofluorobenzene (S)	98	%.	82-120	1		07/11/19 14:26	460-00-4	
Toluene-d8 (S)	107	%.	82-109	1		07/11/19 14:26	2037-26-5	
4500PE Ortho Phosphorus	Analytical Method: SM 4500-P							
Orthophosphate as P	**32.9**	mg/L	12.5	50		07/15/19 18:04		H1
4500S2D Sulfide Water	Analytical Method: SM 4500-S2 D							
Sulfide	ND	mg/L	1.0	1		07/12/19 10:16	18496-25-8	
350.1 Ammonia	Analytical Method: EPA 350.1							
Nitrogen, Ammonia	**13.6**	mg/L	0.20	1		07/11/19 15:52	7664-41-7	
5310B TOC	Analytical Method: SM 5310B							
Total Organic Carbon	**366**	mg/L	10.0	10		07/16/19 15:02	7440-44-0	
9056 IC Anions 48hr	Analytical Method: EPA 9056A							
Nitrate as N	**4.5**	mg/L	0.25	1		07/11/19 01:31	14797-55-8	M1
9056 IC Anions	Analytical Method: EPA 9056A							
Sulfate	**7.8**	mg/L	1.0	1		07/16/19 19:20	14808-79-8	M1

REPORT OF LABORATORY ANALYSIS

Pace Analytical Services, LLC
110 Technology Parkway
Peachtree Corners, GA 30092
(770)734-4200

ANALYTICAL RESULTS

Project: FabraCare Fort Valley GA
Pace Project No.: 2620646

Sample: GW-014918-070919-SAG-005 **Lab ID: 2620646002** Collected: 07/09/19 11:05 Received: 07/10/19 13:40 Matrix: Water

Parameters	Results	Units	Report Limit	DF	Prepared	Analyzed	CAS No.	Qual
RSK 175 Headspace	Analytical Method: RSK 175 Modified							
Ethane	ND	ug/L	10.0	1		07/13/19 13:34	74-84-0	
Ethene	ND	ug/L	10.0	1		07/13/19 13:34	74-85-1	
Methane	**4790**	ug/L	10.0	1		07/13/19 13:34	74-82-8	
6010D MET ICP	Analytical Method: EPA 6010D Preparation Method: EPA 3010A							
Iron	**55200**	ug/L	100	1	07/11/19 13:21	07/12/19 19:04	7439-89-6	
Manganese	**102**	ug/L	15.0	1	07/11/19 13:21	07/12/19 19:04	7439-96-5	
6010D MET ICP Dissolved	Analytical Method: EPA 6010D Preparation Method: EPA 3010A							
Iron, Dissolved	**55300**	ug/L	100	1	07/11/19 13:35	07/12/19 21:43	7439-89-6	
Manganese, Dissolved	**102**	ug/L	15.0	1	07/11/19 13:35	07/12/19 21:43	7439-96-5	
8260B MSV	Analytical Method: EPA 8260B							
cis-1,2-Dichloroethene	**527**	ug/L	10.0	10		07/12/19 13:50	156-59-2	
trans-1,2-Dichloroethene	ND	ug/L	1.0	1		07/11/19 14:52	156-60-5	
Tetrachloroethene	ND	ug/L	1.0	1		07/11/19 14:52	127-18-4	
Trichloroethene	ND	ug/L	1.0	1		07/11/19 14:52	79-01-6	
Vinyl chloride	**1.3**	ug/L	1.0	1		07/11/19 14:52	75-01-4	
Surrogates								
1,2-Dichloroethane-d4 (S)	93	%.	81-119	1		07/11/19 14:52	17060-07-0	
Dibromofluoromethane (S)	90	%.	82-114	1		07/11/19 14:52	1868-53-7	
4-Bromofluorobenzene (S)	101	%.	82-120	1		07/11/19 14:52	460-00-4	
Toluene-d8 (S)	107	%.	82-109	1		07/11/19 14:52	2037-26-5	
4500PE Ortho Phosphorus	Analytical Method: SM 4500-P							
Orthophosphate as P	ND	mg/L	2.5	10		07/15/19 18:06		H1
4500S2D Sulfide Water	Analytical Method: SM 4500-S2 D							
Sulfide	ND	mg/L	1.0	1		07/12/19 10:17	18496-25-8	
350.1 Ammonia	Analytical Method: EPA 350.1							
Nitrogen, Ammonia	**0.49**	mg/L	0.20	1		07/11/19 15:53	7664-41-7	
5310B TOC	Analytical Method: SM 5310B							
Total Organic Carbon	**2.9**	mg/L	1.0	1		07/16/19 15:17	7440-44-0	
9056 IC Anions 48hr	Analytical Method: EPA 9056A							
Nitrate as N	ND	mg/L	0.25	1		07/11/19 02:39	14797-55-8	
9056 IC Anions	Analytical Method: EPA 9056A							
Sulfate	ND	mg/L	1.0	1		07/16/19 20:28	14808-79-8	

REPORT OF LABORATORY ANALYSIS

Pace Analytical Services, LLC
110 Technology Parkway
Peachtree Corners, GA 30092
(770)734-4200

ANALYTICAL RESULTS

Project: FabraCare Fort Valley GA
Pace Project No.: 2620646

Sample: GW-014918-070919-SAG-006 **Lab ID: 2620646003** Collected: 07/09/19 13:15 Received: 07/10/19 13:40 Matrix: Water

Parameters	Results	Units	Report Limit	DF	Prepared	Analyzed	CAS No.	Qual
RSK 175 Headspace	Analytical Method: RSK 175 Modified							
Ethane	ND	ug/L	10.0	1		07/12/19 17:48	74-84-0	
Ethene	ND	ug/L	10.0	1		07/12/19 17:48	74-85-1	
Methane	**5940**	ug/L	10.0	1		07/12/19 17:48	74-82-8	
6010D MET ICP	Analytical Method: EPA 6010D Preparation Method: EPA 3010A							
Iron	**71300**	ug/L	100	1	07/11/19 13:21	07/12/19 19:09	7439-89-6	
Manganese	**76.3**	ug/L	15.0	1	07/11/19 13:21	07/12/19 19:09	7439-96-5	
6010D MET ICP Dissolved	Analytical Method: EPA 6010D Preparation Method: EPA 3010A							
Iron, Dissolved	**72100**	ug/L	100	1	07/11/19 13:35	07/12/19 21:48	7439-89-6	
Manganese, Dissolved	**77.1**	ug/L	15.0	1	07/11/19 13:35	07/12/19 21:48	7439-96-5	
8260B MSV	Analytical Method: EPA 8260B							
cis-1,2-Dichloroethene	**302**	ug/L	10.0	10		07/12/19 14:16	156-59-2	
trans-1,2-Dichloroethene	ND	ug/L	1.0	1		07/11/19 17:28	156-60-5	
Tetrachloroethene	ND	ug/L	1.0	1		07/11/19 17:28	127-18-4	
Trichloroethene	ND	ug/L	1.0	1		07/11/19 17:28	79-01-6	
Vinyl chloride	**2.3**	ug/L	1.0	1		07/11/19 17:28	75-01-4	
Surrogates								
1,2-Dichloroethane-d4 (S)	90	%.	81-119	1		07/11/19 17:28	17060-07-0	
Dibromofluoromethane (S)	92	%.	82-114	1		07/11/19 17:28	1868-53-7	
4-Bromofluorobenzene (S)	100	%.	82-120	1		07/11/19 17:28	460-00-4	
Toluene-d8 (S)	104	%.	82-109	1		07/11/19 17:28	2037-26-5	
4500PE Ortho Phosphorus	Analytical Method: SM 4500-P							
Orthophosphate as P	ND	mg/L	2.5	10		07/15/19 18:06		H1
4500S2D Sulfide Water	Analytical Method: SM 4500-S2 D							
Sulfide	ND	mg/L	1.0	1		07/12/19 10:17	18496-25-8	
350.1 Ammonia	Analytical Method: EPA 350.1							
Nitrogen, Ammonia	ND	mg/L	0.20	1		07/11/19 15:55	7664-41-7	
5310B TOC	Analytical Method: SM 5310B							
Total Organic Carbon	**3.4**	mg/L	1.0	1		07/16/19 15:33	7440-44-0	
9056 IC Anions 48hr	Analytical Method: EPA 9056A							
Nitrate as N	ND	mg/L	0.25	1		07/11/19 03:01	14797-55-8	
9056 IC Anions	Analytical Method: EPA 9056A							
Sulfate	ND	mg/L	1.0	1		07/16/19 20:51	14808-79-8	

REPORT OF LABORATORY ANALYSIS

Pace Analytical Services, LLC
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ANALYTICAL RESULTS

Project: FabraCare Fort Valley GA
Pace Project No.: 2620646

Sample: GW-014918-070919-SAG-007 **Lab ID: 2620646004** Collected: 07/10/19 08:40 Received: 07/10/19 13:40 Matrix: Water

Parameters	Results	Units	Report Limit	DF	Prepared	Analyzed	CAS No.	Qual
8260B MSV	Analytical Method: EPA 8260B							
cis-1,2-Dichloroethene	ND	ug/L	1.0	1		07/11/19 17:54	156-59-2	
trans-1,2-Dichloroethene	ND	ug/L	1.0	1		07/11/19 17:54	156-60-5	
Tetrachloroethene	ND	ug/L	1.0	1		07/11/19 17:54	127-18-4	
Trichloroethene	ND	ug/L	1.0	1		07/11/19 17:54	79-01-6	
Vinyl chloride	ND	ug/L	1.0	1		07/11/19 17:54	75-01-4	
Surrogates								
1,2-Dichloroethane-d4 (S)	47	%.	81-119	1		07/11/19 17:54	17060-07-0	S0
Dibromofluoromethane (S)	84	%.	82-114	1		07/11/19 17:54	1868-53-7	
4-Bromofluorobenzene (S)	157	%.	82-120	1		07/11/19 17:54	460-00-4	S3
Toluene-d8 (S)	121	%.	82-109	1		07/11/19 17:54	2037-26-5	S3

REPORT OF LABORATORY ANALYSIS

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ANALYTICAL RESULTS

Project: FabraCare Fort Valley GA
Pace Project No.: 2620646

Sample: GW-014918-070919-DJB-105 **Lab ID: 2620646005** Collected: 07/09/19 08:50 Received: 07/10/19 13:40 Matrix: Water

Parameters	Results	Units	Report Limit	DF	Prepared	Analyzed	CAS No.	Qual
8260B MSV	Analytical Method: EPA 8260B							
cis-1,2-Dichloroethene	ND	ug/L	1.0	1		07/12/19 12:57	156-59-2	
trans-1,2-Dichloroethene	ND	ug/L	1.0	1		07/12/19 12:57	156-60-5	
Tetrachloroethene	**24.8**	ug/L	1.0	1		07/12/19 12:57	127-18-4	
Trichloroethene	ND	ug/L	1.0	1		07/12/19 12:57	79-01-6	
Vinyl chloride	ND	ug/L	1.0	1		07/12/19 12:57	75-01-4	
Surrogates								
1,2-Dichloroethane-d4 (S)	96	%.	81-119	1		07/12/19 12:57	17060-07-0	
Dibromofluoromethane (S)	95	%.	82-114	1		07/12/19 12:57	1868-53-7	
4-Bromofluorobenzene (S)	101	%.	82-120	1		07/12/19 12:57	460-00-4	
Toluene-d8 (S)	104	%.	82-109	1		07/12/19 12:57	2037-26-5	

REPORT OF LABORATORY ANALYSIS

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ANALYTICAL RESULTS

Project: FabraCare Fort Valley GA
Pace Project No.: 2620646

Sample: GW-014918-070919-DJB-106 **Lab ID: 2620646006** Collected: 07/09/19 09:55 Received: 07/10/19 13:40 Matrix: Water

Parameters	Results	Units	Report Limit	DF	Prepared	Analyzed	CAS No.	Qual
8260B MSV	Analytical Method: EPA 8260B							
cis-1,2-Dichloroethene	ND	ug/L	1.0	1		07/11/19 18:46	156-59-2	
trans-1,2-Dichloroethene	ND	ug/L	1.0	1		07/11/19 18:46	156-60-5	
Tetrachloroethene	ND	ug/L	1.0	1		07/11/19 18:46	127-18-4	
Trichloroethene	ND	ug/L	1.0	1		07/11/19 18:46	79-01-6	
Vinyl chloride	ND	ug/L	1.0	1		07/11/19 18:46	75-01-4	
Surrogates								
1,2-Dichloroethane-d4 (S)	92	%.	81-119	1		07/11/19 18:46	17060-07-0	
Dibromofluoromethane (S)	94	%.	82-114	1		07/11/19 18:46	1868-53-7	
4-Bromofluorobenzene (S)	103	%.	82-120	1		07/11/19 18:46	460-00-4	
Toluene-d8 (S)	105	%.	82-109	1		07/11/19 18:46	2037-26-5	

REPORT OF LABORATORY ANALYSIS

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ANALYTICAL RESULTS

Project: FabraCare Fort Valley GA
Pace Project No.: 2620646

Sample: GW-014918-070919-DJB-107 **Lab ID: 2620646007** Collected: 07/09/19 12:30 Received: 07/10/19 13:40 Matrix: Water

Parameters	Results	Units	Report Limit	DF	Prepared	Analyzed	CAS No.	Qual
RSK 175 Headspace	Analytical Method: RSK 175 Modified							
Ethane	ND	ug/L	10.0	1		07/12/19 17:18	74-84-0	
Ethene	ND	ug/L	10.0	1		07/12/19 17:18	74-85-1	
Methane	ND	ug/L	10.0	1		07/12/19 17:18	74-82-8	
6010D MET ICP	Analytical Method: EPA 6010D Preparation Method: EPA 3010A							
Iron	**5390**	ug/L	100	1	07/11/19 13:21	07/12/19 19:14	7439-89-6	
Manganese	**20.8**	ug/L	15.0	1	07/11/19 13:21	07/12/19 19:14	7439-96-5	
6010D MET ICP Dissolved	Analytical Method: EPA 6010D Preparation Method: EPA 3010A							
Iron, Dissolved	**166**	ug/L	100	1	07/11/19 13:35	07/12/19 22:04	7439-89-6	
Manganese, Dissolved	**18.6**	ug/L	15.0	1	07/11/19 13:35	07/12/19 22:04	7439-96-5	
8260B MSV	Analytical Method: EPA 8260B							
cis-1,2-Dichloroethene	**25.3**	ug/L	1.0	1		07/11/19 19:12	156-59-2	
trans-1,2-Dichloroethene	ND	ug/L	1.0	1		07/11/19 19:12	156-60-5	
Tetrachloroethene	**135**	ug/L	1.0	1		07/11/19 19:12	127-18-4	
Trichloroethene	**5.3**	ug/L	1.0	1		07/11/19 19:12	79-01-6	
Vinyl chloride	ND	ug/L	1.0	1		07/11/19 19:12	75-01-4	
Surrogates								
1,2-Dichloroethane-d4 (S)	88	%.	81-119	1		07/11/19 19:12	17060-07-0	
Dibromofluoromethane (S)	93	%.	82-114	1		07/11/19 19:12	1868-53-7	
4-Bromofluorobenzene (S)	98	%.	82-120	1		07/11/19 19:12	460-00-4	
Toluene-d8 (S)	104	%.	82-109	1		07/11/19 19:12	2037-26-5	
4500PE Ortho Phosphorus	Analytical Method: SM 4500-P							
Orthophosphate as P	ND	mg/L	0.25	1		07/15/19 18:11		H1
4500S2D Sulfide Water	Analytical Method: SM 4500-S2 D							
Sulfide	ND	mg/L	1.0	1		07/12/19 10:34	18496-25-8	
350.1 Ammonia	Analytical Method: EPA 350.1							
Nitrogen, Ammonia	ND	mg/L	0.20	1		07/11/19 15:56	7664-41-7	
5310B TOC	Analytical Method: SM 5310B							
Total Organic Carbon	**1.3**	mg/L	1.0	1		07/16/19 15:46	7440-44-0	
9056 IC Anions 48hr	Analytical Method: EPA 9056A							
Nitrate as N	**3.2**	mg/L	0.25	1		07/11/19 12:35	14797-55-8	H1
9056 IC Anions	Analytical Method: EPA 9056A							
Sulfate	ND	mg/L	1.0	1		07/16/19 21:13	14808-79-8	

REPORT OF LABORATORY ANALYSIS

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ANALYTICAL RESULTS

Project: FabraCare Fort Valley GA
Pace Project No.: 2620646

Sample: GW-014918-070919-DJB-108 **Lab ID: 2620646008** Collected: 07/09/19 16:30 Received: 07/10/19 13:40 Matrix: Water

Parameters	Results	Units	Report Limit	DF	Prepared	Analyzed	CAS No.	Qual
RSK 175 Headspace	Analytical Method: RSK 175 Modified							
Ethane	ND	ug/L	10.0	1		07/12/19 17:33	74-84-0	
Ethene	ND	ug/L	10.0	1		07/12/19 17:33	74-85-1	
Methane	ND	ug/L	10.0	1		07/12/19 17:33	74-82-8	
6010D MET ICP	Analytical Method: EPA 6010D Preparation Method: EPA 3010A							
Iron	**511**	ug/L	100	1	07/11/19 13:21	07/12/19 19:19	7439-89-6	
Manganese	**42.2**	ug/L	15.0	1	07/11/19 13:21	07/12/19 19:19	7439-96-5	
6010D MET ICP Dissolved	Analytical Method: EPA 6010D Preparation Method: EPA 3010A							
Iron, Dissolved	ND	ug/L	100	1	07/11/19 13:35	07/12/19 22:25	7439-89-6	
Manganese, Dissolved	ND	ug/L	15.0	1	07/11/19 13:35	07/12/19 22:25	7439-96-5	
8260B MSV	Analytical Method: EPA 8260B							
cis-1,2-Dichloroethene	ND	ug/L	1.0	1		07/11/19 19:38	156-59-2	
trans-1,2-Dichloroethene	ND	ug/L	1.0	1		07/11/19 19:38	156-60-5	
Tetrachloroethene	**37.6**	ug/L	1.0	1		07/11/19 19:38	127-18-4	
Trichloroethene	ND	ug/L	1.0	1		07/11/19 19:38	79-01-6	
Vinyl chloride	ND	ug/L	1.0	1		07/11/19 19:38	75-01-4	
Surrogates								
1,2-Dichloroethane-d4 (S)	94	%.	81-119	1		07/11/19 19:38	17060-07-0	
Dibromofluoromethane (S)	86	%.	82-114	1		07/11/19 19:38	1868-53-7	
4-Bromofluorobenzene (S)	102	%.	82-120	1		07/11/19 19:38	460-00-4	
Toluene-d8 (S)	108	%.	82-109	1		07/11/19 19:38	2037-26-5	
4500PE Ortho Phosphorus	Analytical Method: SM 4500-P							
Orthophosphate as P	ND	mg/L	0.25	1		07/15/19 18:12		H1
4500S2D Sulfide Water	Analytical Method: SM 4500-S2 D							
Sulfide	ND	mg/L	1.0	1		07/12/19 16:05	18496-25-8	
350.1 Ammonia	Analytical Method: EPA 350.1							
Nitrogen, Ammonia	ND	mg/L	0.20	1		07/11/19 15:58	7664-41-7	
5310B TOC	Analytical Method: SM 5310B							
Total Organic Carbon	**1.0**	mg/L	1.0	1		07/16/19 16:40	7440-44-0	
9056 IC Anions 48hr	Analytical Method: EPA 9056A							
Nitrate as N	**3.6**	mg/L	0.25	1		07/11/19 13:43	14797-55-8	
9056 IC Anions	Analytical Method: EPA 9056A							
Sulfate	**66.2**	mg/L	2.0	2		07/16/19 21:36	14808-79-8	

REPORT OF LABORATORY ANALYSIS

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ANALYTICAL RESULTS

Project: FabraCare Fort Valley GA
Pace Project No.: 2620646

Sample: GW-014918-071019-DJB-109 **Lab ID: 2620646009** Collected: 07/10/19 08:30 Received: 07/10/19 13:40 Matrix: Water

Parameters	Results	Units	Report Limit	DF	Prepared	Analyzed	CAS No.	Qual
8260B MSV	Analytical Method: EPA 8260B							
cis-1,2-Dichloroethene	ND	ug/L	1.0	1		07/12/19 16:00	156-59-2	
trans-1,2-Dichloroethene	ND	ug/L	1.0	1		07/12/19 16:00	156-60-5	
Tetrachloroethene	**21.0**	ug/L	1.0	1		07/12/19 16:00	127-18-4	
Trichloroethene	ND	ug/L	1.0	1		07/12/19 16:00	79-01-6	
Vinyl chloride	ND	ug/L	1.0	1		07/12/19 16:00	75-01-4	
Surrogates								
1,2-Dichloroethane-d4 (S)	94	%.	81-119	1		07/12/19 16:00	17060-07-0	
Dibromofluoromethane (S)	87	%.	82-114	1		07/12/19 16:00	1868-53-7	
4-Bromofluorobenzene (S)	101	%.	82-120	1		07/12/19 16:00	460-00-4	
Toluene-d8 (S)	107	%.	82-109	1		07/12/19 16:00	2037-26-5	

REPORT OF LABORATORY ANALYSIS

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ANALYTICAL RESULTS

Project: FabraCare Fort Valley GA
Pace Project No.: 2620646

Sample: GW-014918-071019-DJB-110 **Lab ID: 2620646010** Collected: 07/10/19 09:30 Received: 07/10/19 13:40 Matrix: Water

Parameters	Results	Units	Report Limit	DF	Prepared	Analyzed	CAS No.	Qual
8260B MSV	Analytical Method: EPA 8260B							
cis-1,2-Dichloroethene	ND	ug/L	1.0	1		07/12/19 16:26	156-59-2	
trans-1,2-Dichloroethene	ND	ug/L	1.0	1		07/12/19 16:26	156-60-5	
Tetrachloroethene	ND	ug/L	1.0	1		07/12/19 16:26	127-18-4	
Trichloroethene	ND	ug/L	1.0	1		07/12/19 16:26	79-01-6	
Vinyl chloride	ND	ug/L	1.0	1		07/12/19 16:26	75-01-4	
Surrogates								
1,2-Dichloroethane-d4 (S)	97	%.	81-119	1		07/12/19 16:26	17060-07-0	
Dibromofluoromethane (S)	88	%.	82-114	1		07/12/19 16:26	1868-53-7	
4-Bromofluorobenzene (S)	101	%.	82-120	1		07/12/19 16:26	460-00-4	
Toluene-d8 (S)	105	%.	82-109	1		07/12/19 16:26	2037-26-5	

REPORT OF LABORATORY ANALYSIS

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ANALYTICAL RESULTS

Project: FabraCare Fort Valley GA
Pace Project No.: 2620646

Sample: Trip Blank **Lab ID: 2620646011** Collected: 07/09/19 00:00 Received: 07/10/19 13:40 Matrix: Water

Parameters	Results	Units	Report Limit	DF	Prepared	Analyzed	CAS No.	Qual
8260B MSV	Analytical Method: EPA 8260B							
cis-1,2-Dichloroethene	ND	ug/L	1.0	1		07/12/19 12:31	156-59-2	
trans-1,2-Dichloroethene	ND	ug/L	1.0	1		07/12/19 12:31	156-60-5	
Tetrachloroethene	ND	ug/L	1.0	1		07/12/19 12:31	127-18-4	
Trichloroethene	ND	ug/L	1.0	1		07/12/19 12:31	79-01-6	
Vinyl chloride	ND	ug/L	1.0	1		07/12/19 12:31	75-01-4	
Surrogates								
1,2-Dichloroethane-d4 (S)	97	%.	81-119	1		07/12/19 12:31	17060-07-0	
Dibromofluoromethane (S)	90	%.	82-114	1		07/12/19 12:31	1868-53-7	
4-Bromofluorobenzene (S)	101	%.	82-120	1		07/12/19 12:31	460-00-4	
Toluene-d8 (S)	106	%.	82-109	1		07/12/19 12:31	2037-26-5	

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QUALITY CONTROL DATA

Project: FabraCare Fort Valley GA
Pace Project No.: 2620646

QC Batch: 486116 Analysis Method: RSK 175 Modified
QC Batch Method: RSK 175 Modified Analysis Description: RSK 175 HEADSPACE
Associated Lab Samples: 2620646001, 2620646003, 2620646007, 2620646008

METHOD BLANK: 2625479 Matrix: Water
Associated Lab Samples: 2620646001, 2620646003, 2620646007, 2620646008

Parameter	Units	Blank Result	Reporting Limit	Analyzed	Qualifiers
Ethane	ug/L	ND	10.0	07/12/19 16:01	
Ethene	ug/L	ND	10.0	07/12/19 16:01	
Methane	ug/L	ND	10.0	07/12/19 16:01	

LABORATORY CONTROL SAMPLE: 2625480

Parameter	Units	Spike Conc.	LCS Result	LCS % Rec	% Rec Limits	Qualifiers
Ethane	ug/L	658	703	107	70-130	
Ethene	ug/L	1120	1190	106	70-130	
Methane	ug/L	396	426	107	70-130	

MATRIX SPIKE SAMPLE: 2625482

Parameter	Units	92436300006 Result	Spike Conc.	MS Result	MS % Rec	% Rec Limits	Qualifiers
Ethane	ug/L	ND	658	727	110	70-130	
Ethene	ug/L	ND	1120	1300	115	70-130	
Methane	ug/L	59.1	396	504	112	70-130	

SAMPLE DUPLICATE: 2625481

Parameter	Units	92436300005 Result	Dup Result	RPD	Max RPD	Qualifiers
Ethane	ug/L	ND	ND		20	
Ethene	ug/L	ND	ND		20	
Methane	ug/L	25.1	30.3	19	20	

SAMPLE DUPLICATE: 2625483

Parameter	Units	92436300011 Result	Dup Result	RPD	Max RPD	Qualifiers
Ethane	ug/L	ND	ND		20	
Ethene	ug/L	ND	ND		20	
Methane	ug/L	ND	ND		20	

Results presented on this page are in the units indicated by the "Units" column except where an alternate unit is presented to the right of the result.

REPORT OF LABORATORY ANALYSIS

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QUALITY CONTROL DATA

Project: FabraCare Fort Valley GA
Pace Project No.: 2620646

QC Batch: 486268 Analysis Method: RSK 175 Modified
QC Batch Method: RSK 175 Modified Analysis Description: RSK 175 HEADSPACE
Associated Lab Samples: 2620646002

METHOD BLANK: 2626236 Matrix: Water
Associated Lab Samples: 2620646002

Parameter	Units	Blank Result	Reporting Limit	Analyzed	Qualifiers
Ethane	ug/L	ND	10.0	07/13/19 10:46	
Ethene	ug/L	ND	10.0	07/13/19 10:46	
Methane	ug/L	ND	10.0	07/13/19 10:46	

LABORATORY CONTROL SAMPLE: 2626237

Parameter	Units	Spike Conc.	LCS Result	LCS % Rec	% Rec Limits	Qualifiers
Ethane	ug/L	658	633	96	70-130	
Ethene	ug/L	1120	1170	104	70-130	
Methane	ug/L	396	410	104	70-130	

MATRIX SPIKE SAMPLE: 2626239

Parameter	Units	92436525002 Result	Spike Conc.	MS Result	MS % Rec	% Rec Limits	Qualifiers
Ethane	ug/L	ND	658	707	107	70-130	
Ethene	ug/L	ND	1120	1370	122	70-130	
Methane	ug/L	16.3	396	454	111	70-130	

SAMPLE DUPLICATE: 2626238

Parameter	Units	92436525001 Result	Dup Result	RPD	Max RPD	Qualifiers
Ethane	ug/L	ND	ND		20	
Ethene	ug/L	ND	ND		20	
Methane	ug/L	102	77.1	28	20	D6

SAMPLE DUPLICATE: 2626240

Parameter	Units	92436525011 Result	Dup Result	RPD	Max RPD	Qualifiers
Ethane	ug/L	ND	ND		20	
Ethene	ug/L	ND	ND		20	
Methane	ug/L	ND	ND		20	

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REPORT OF LABORATORY ANALYSIS

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QUALITY CONTROL DATA

Project: FabraCare Fort Valley GA
Pace Project No.: 2620646

QC Batch: 31653 Analysis Method: EPA 6010D
QC Batch Method: EPA 3010A Analysis Description: 6010D MET
Associated Lab Samples: 2620646001, 2620646002, 2620646003, 2620646007, 2620646008

METHOD BLANK: 142378 Matrix: Water
Associated Lab Samples: 2620646001, 2620646002, 2620646003, 2620646007, 2620646008

Parameter	Units	Blank Result	Reporting Limit	Analyzed	Qualifiers
Iron	ug/L	ND	100	07/12/19 18:16	
Manganese	ug/L	ND	15.0	07/12/19 18:16	

LABORATORY CONTROL SAMPLE: 142379

Parameter	Units	Spike Conc.	LCS Result	LCS % Rec	% Rec Limits	Qualifiers
Iron	ug/L	1000	952	95	80-120	
Manganese	ug/L	1000	961	96	80-120	

MATRIX SPIKE & MATRIX SPIKE DUPLICATE: 142380 142381

Parameter	Units	2620642001 Result	MS Spike Conc.	MSD Spike Conc.	MS Result	MSD Result	MS % Rec	MSD % Rec	% Rec Limits	RPD	Max RPD	Qual
Iron	ug/L	61.6	1000	1000	987	1060	92	99	75-125	7	20	
Manganese	ug/L	ND	1000	1000	935	963	93	96	75-125	3	20	

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REPORT OF LABORATORY ANALYSIS

Pace Analytical Services, LLC
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(770)734-4200

QUALITY CONTROL DATA

Project: FabraCare Fort Valley GA
Pace Project No.: 2620646

QC Batch: 31652 Analysis Method: EPA 6010D
QC Batch Method: EPA 3010A Analysis Description: 6010D MET Dissolved
Associated Lab Samples: 2620646001, 2620646002, 2620646003, 2620646007, 2620646008

METHOD BLANK: 142374 Matrix: Water
Associated Lab Samples: 2620646001, 2620646002, 2620646003, 2620646007, 2620646008

Parameter	Units	Blank Result	Reporting Limit	Analyzed	Qualifiers
Iron, Dissolved	ug/L	ND	100	07/12/19 21:11	
Manganese, Dissolved	ug/L	ND	15.0	07/12/19 21:11	

LABORATORY CONTROL SAMPLE: 142375

Parameter	Units	Spike Conc.	LCS Result	LCS % Rec	% Rec Limits	Qualifiers
Iron, Dissolved	ug/L	1000	981	98	80-120	
Manganese, Dissolved	ug/L	1000	1010	101	80-120	

MATRIX SPIKE & MATRIX SPIKE DUPLICATE: 142376 142377

Parameter	Units	2620646007 Result	MS Spike Conc.	MSD Spike Conc.	MS Result	MSD Result	MS % Rec	MSD % Rec	% Rec Limits	RPD	Max RPD	Qual
Iron, Dissolved	ug/L	166	1000	1000	1190	1160	102	99	75-125	3	20	
Manganese, Dissolved	ug/L	18.6	1000	1000	1040	1020	102	100	75-125	2	20	

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REPORT OF LABORATORY ANALYSIS

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QUALITY CONTROL DATA

Project: FabraCare Fort Valley GA
Pace Project No.: 2620646

QC Batch: 31641 Analysis Method: EPA 8260B
QC Batch Method: EPA 8260B Analysis Description: 8260B MSV
Associated Lab Samples: 2620646001, 2620646002, 2620646003, 2620646004, 2620646005, 2620646006, 2620646007, 2620646008, 2620646009, 2620646010, 2620646011

METHOD BLANK: 142331 Matrix: Water
Associated Lab Samples: 2620646001, 2620646002, 2620646003, 2620646004, 2620646005, 2620646006, 2620646007, 2620646008, 2620646009, 2620646010, 2620646011

Parameter	Units	Blank Result	Reporting Limit	Analyzed	Qualifiers
cis-1,2-Dichloroethene	ug/L	ND	1.0	07/11/19 11:50	
Tetrachloroethene	ug/L	ND	1.0	07/11/19 11:50	
trans-1,2-Dichloroethene	ug/L	ND	1.0	07/11/19 11:50	
Trichloroethene	ug/L	ND	1.0	07/11/19 11:50	
Vinyl chloride	ug/L	ND	1.0	07/11/19 11:50	
1,2-Dichloroethane-d4 (S)	%.	90	81-119	07/11/19 11:50	
4-Bromofluorobenzene (S)	%.	102	82-120	07/11/19 11:50	
Dibromofluoromethane (S)	%.	87	82-114	07/11/19 11:50	
Toluene-d8 (S)	%.	105	82-109	07/11/19 11:50	

LABORATORY CONTROL SAMPLE: 142332

Parameter	Units	Spike Conc.	LCS Result	LCS % Rec	% Rec Limits	Qualifiers
cis-1,2-Dichloroethene	ug/L	50	45.7	91	74-131	
Tetrachloroethene	ug/L	50	47.8	96	51-139	
trans-1,2-Dichloroethene	ug/L	50	47.3	95	69-144	
Trichloroethene	ug/L	50	40.5	81	73-126	
Vinyl chloride	ug/L	50	39.1	78	50-133	
1,2-Dichloroethane-d4 (S)	%.			90	81-119	
4-Bromofluorobenzene (S)	%.			104	82-120	
Dibromofluoromethane (S)	%.			96	82-114	
Toluene-d8 (S)	%.			104	82-109	

MATRIX SPIKE & MATRIX SPIKE DUPLICATE: 142333 142334

Parameter	Units	2620646005 Result	MS Spike Conc.	MSD Spike Conc.	MS Result	MSD Result	MS % Rec	MSD % Rec	% Rec Limits	RPD	Max RPD	Qual
cis-1,2-Dichloroethene	ug/L	ND	50	50	55.1	54.4	110	108	71-138	1	16	
Tetrachloroethene	ug/L	24.8	50	50	78.8	78.3	108	107	36-155	1	14	
trans-1,2-Dichloroethene	ug/L	ND	50	50	57.4	57.9	115	116	61-152	1	14	
Trichloroethene	ug/L	ND	50	50	46.7	48.9	93	98	61-141	4	12	
Vinyl chloride	ug/L	ND	50	50	54.6	55.9	109	112	22-156	2	26	
1,2-Dichloroethane-d4 (S)	%.						95	93	81-119			
4-Bromofluorobenzene (S)	%.						105	105	82-120			
Dibromofluoromethane (S)	%.						101	97	82-114			
Toluene-d8 (S)	%.						106	107	82-109			

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REPORT OF LABORATORY ANALYSIS

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QUALITY CONTROL DATA

Project: FabraCare Fort Valley GA
Pace Project No.: 2620646

QC Batch: 31619 Analysis Method: SM 4500-P
QC Batch Method: SM 4500-P Analysis Description: 4500PE Ortho Phosphorus
Associated Lab Samples: 2620646001, 2620646002, 2620646003, 2620646007, 2620646008

METHOD BLANK: 142154 Matrix: Water
Associated Lab Samples: 2620646001, 2620646002, 2620646003, 2620646007, 2620646008

Parameter	Units	Blank Result	Reporting Limit	Analyzed	Qualifiers
Orthophosphate as P	mg/L	ND	0.25	07/15/19 17:58	

LABORATORY CONTROL SAMPLE: 142155

Parameter	Units	Spike Conc.	LCS Result	LCS % Rec	% Rec Limits	Qualifiers
Orthophosphate as P	mg/L	0.5	0.52	105	80-120	

MATRIX SPIKE & MATRIX SPIKE DUPLICATE: 142156 142157

Parameter	Units	2620600001 Result	MS Spike Conc.	MSD Spike Conc.	MS Result	MSD Result	MS % Rec	MSD % Rec	% Rec Limits	RPD	Max RPD	Qual
Orthophosphate as P	mg/L	2.3	10	10	12.9	12.9	106	107	80-120	0	10	H1

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REPORT OF LABORATORY ANALYSIS

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QUALITY CONTROL DATA

Project: FabraCare Fort Valley GA
Pace Project No.: 2620646

QC Batch: 31696 Analysis Method: SM 4500-S2 D
QC Batch Method: SM 4500-S2 D Analysis Description: 4500S2D Sulfide Water
Associated Lab Samples: 2620646001, 2620646002, 2620646003, 2620646007

METHOD BLANK: 142632 Matrix: Water
Associated Lab Samples: 2620646001, 2620646002, 2620646003, 2620646007

Parameter	Units	Blank Result	Reporting Limit	Analyzed	Qualifiers
Sulfide	mg/L	ND	1.0	07/12/19 09:28	

LABORATORY CONTROL SAMPLE: 142633

Parameter	Units	Spike Conc.	LCS Result	LCS % Rec	% Rec Limits	Qualifiers
Sulfide	mg/L	0.5	.51J	102	80-120	

MATRIX SPIKE & MATRIX SPIKE DUPLICATE: 142640 142641

Parameter	Units	2620653018 Result	MS Spike Conc.	MSD Spike Conc.	MS Result	MSD Result	MS % Rec	MSD % Rec	% Rec Limits	RPD	Max RPD	Qual
Sulfide	mg/L	ND	0.5	0.5	.52J	.51J	104	103	30-129	1	10	

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QUALITY CONTROL DATA

Project: FabraCare Fort Valley GA
Pace Project No.: 2620646

QC Batch: 31723 Analysis Method: SM 4500-S2 D
QC Batch Method: SM 4500-S2 D Analysis Description: 4500S2D Sulfide Water
Associated Lab Samples: 2620646008

METHOD BLANK: 142787 Matrix: Water
Associated Lab Samples: 2620646008

Parameter	Units	Blank Result	Reporting Limit	Analyzed	Qualifiers
Sulfide	mg/L	ND	1.0	07/12/19 16:02	

LABORATORY CONTROL SAMPLE: 142788

Parameter	Units	Spike Conc.	LCS Result	LCS % Rec	% Rec Limits	Qualifiers
Sulfide	mg/L	0.5	.52J	103	80-120	

MATRIX SPIKE & MATRIX SPIKE DUPLICATE: 142836 142837

Parameter	Units	2620646008 Result	MS Spike Conc.	MSD Spike Conc.	MS Result	MSD Result	MS % Rec	MSD % Rec	% Rec Limits	RPD	Max RPD	Qual
Sulfide	mg/L	ND	0.5	0.5	.52J	.52J	99	99	30-129	0	10	

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QUALITY CONTROL DATA

Project: FabraCare Fort Valley GA
Pace Project No.: 2620646

QC Batch: 31634 Analysis Method: EPA 350.1
QC Batch Method: EPA 350.1 Analysis Description: 350.1 Ammonia
Associated Lab Samples: 2620646001, 2620646002, 2620646003, 2620646007, 2620646008

METHOD BLANK: 142277 Matrix: Water
Associated Lab Samples: 2620646001, 2620646002, 2620646003, 2620646007, 2620646008

Parameter	Units	Blank Result	Reporting Limit	Analyzed	Qualifiers
Nitrogen, Ammonia	mg/L	ND	0.20	07/11/19 15:43	

LABORATORY CONTROL SAMPLE: 142278

Parameter	Units	Spike Conc.	LCS Result	LCS % Rec	% Rec Limits	Qualifiers
Nitrogen, Ammonia	mg/L	10	10.5	105	90-110	

MATRIX SPIKE SAMPLE: 142279

Parameter	Units	2620640002 Result	Spike Conc.	MS Result	MS % Rec	% Rec Limits	Qualifiers
Nitrogen, Ammonia	mg/L	5.5	10	16.0	105	90-110	

MATRIX SPIKE SAMPLE: 142280

Parameter	Units	2620618007 Result	Spike Conc.	MS Result	MS % Rec	% Rec Limits	Qualifiers
Nitrogen, Ammonia	mg/L	0.32	10	10.9	106	90-110	

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QUALITY CONTROL DATA

Project: FabraCare Fort Valley GA
Pace Project No.: 2620646

QC Batch: 553762 Analysis Method: SM 5310B
QC Batch Method: SM 5310B Analysis Description: 5310B TOC
Associated Lab Samples: 2620646001, 2620646002, 2620646003, 2620646007, 2620646008

METHOD BLANK: 3004386 Matrix: Water
Associated Lab Samples: 2620646001, 2620646002, 2620646003, 2620646007, 2620646008

Parameter	Units	Blank Result	Reporting Limit	Analyzed	Qualifiers
Total Organic Carbon	mg/L	ND	1.0	07/16/19 09:40	

LABORATORY CONTROL SAMPLE: 3004387

Parameter	Units	Spike Conc.	LCS Result	LCS % Rec	% Rec Limits	Qualifiers
Total Organic Carbon	mg/L	20	18.9	95	90-110	

MATRIX SPIKE & MATRIX SPIKE DUPLICATE: 3004388 3004389

Parameter	Units	2620505001 Result	MS Spike Conc.	MSD Spike Conc.	MS Result	MSD Result	MS % Rec	MSD % Rec	% Rec Limits	RPD	Max RPD	Qual
Total Organic Carbon	mg/L	3.3	20	20	22.2	22.4	95	96	80-120	1	20	

MATRIX SPIKE & MATRIX SPIKE DUPLICATE: 3004390 3004391

Parameter	Units	2620505002 Result	MS Spike Conc.	MSD Spike Conc.	MS Result	MSD Result	MS % Rec	MSD % Rec	% Rec Limits	RPD	Max RPD	Qual
Total Organic Carbon	mg/L	2.1	20	20	21.2	21.7	96	98	80-120	2	20	

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REPORT OF LABORATORY ANALYSIS

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QUALITY CONTROL DATA

Project: FabraCare Fort Valley GA
Pace Project No.: 2620646

QC Batch: 31617 Analysis Method: EPA 9056A
QC Batch Method: EPA 9056A Analysis Description: 9056 IC Anions
Associated Lab Samples: 2620646001, 2620646002, 2620646003

METHOD BLANK: 142143 Matrix: Water
Associated Lab Samples: 2620646001, 2620646002, 2620646003

Parameter	Units	Blank Result	Reporting Limit	Analyzed	Qualifiers
Nitrate as N	mg/L	ND	0.25	07/11/19 00:45	

LABORATORY CONTROL SAMPLE: 142144

Parameter	Units	Spike Conc.	LCS Result	LCS % Rec	% Rec Limits	Qualifiers
Nitrate as N	mg/L	10	10.5	105	90-110	

MATRIX SPIKE & MATRIX SPIKE DUPLICATE: 142145 142146

Parameter	Units	2620646001 Result	MS Spike Conc.	MSD Spike Conc.	MS Result	MSD Result	MS % Rec	MSD % Rec	% Rec Limits	RPD	Max RPD	Qual
Nitrate as N	mg/L	4.5	10	10	13.5	13.6	89	91	90-110	1	15	M1

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REPORT OF LABORATORY ANALYSIS

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QUALITY CONTROL DATA

Project: FabraCare Fort Valley GA
Pace Project No.: 2620646

QC Batch: 31642 Analysis Method: EPA 9056A
QC Batch Method: EPA 9056A Analysis Description: 9056 IC Anions
Associated Lab Samples: 2620646007, 2620646008

METHOD BLANK: 142341 Matrix: Water
Associated Lab Samples: 2620646007, 2620646008

Parameter	Units	Blank Result	Reporting Limit	Analyzed	Qualifiers
Nitrate as N	mg/L	ND	0.25	07/11/19 12:13	

LABORATORY CONTROL SAMPLE: 142342

Parameter	Units	Spike Conc.	LCS Result	LCS % Rec	% Rec Limits	Qualifiers
Nitrate as N	mg/L	10	10.6	106	90-110	

MATRIX SPIKE & MATRIX SPIKE DUPLICATE: 142343 142344

Parameter	Units	2620646007 Result	MS Spike Conc.	MSD Spike Conc.	MS Result	MSD Result	MS % Rec	MSD % Rec	% Rec Limits	RPD	Max RPD	Qual
Nitrate as N	mg/L	3.2	10	10	13.4	13.4	102	102	90-110	0	15	H1

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REPORT OF LABORATORY ANALYSIS

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QUALITY CONTROL DATA

Project: FabraCare Fort Valley GA
Pace Project No.: 2620646

QC Batch: 31889 Analysis Method: EPA 9056A
QC Batch Method: EPA 9056A Analysis Description: 9056 IC Anions
Associated Lab Samples: 2620646001, 2620646002, 2620646003, 2620646007, 2620646008

METHOD BLANK: 143465 Matrix: Water
Associated Lab Samples: 2620646001, 2620646002, 2620646003, 2620646007, 2620646008

Parameter	Units	Blank Result	Reporting Limit	Analyzed	Qualifiers
Sulfate	mg/L	ND	1.0	07/16/19 18:35	

LABORATORY CONTROL SAMPLE: 143466

Parameter	Units	Spike Conc.	LCS Result	LCS % Rec	% Rec Limits	Qualifiers
Sulfate	mg/L	10	10.1	101	90-110	

MATRIX SPIKE & MATRIX SPIKE DUPLICATE: 143467 143468

Parameter	Units	2620646001 Result	MS Spike Conc.	MSD Spike Conc.	MS Result	MSD Result	MS % Rec	MSD % Rec	% Rec Limits	RPD	Max RPD	Qual
Sulfate	mg/L	7.8	10	10	9.6	9.6	19	19	90-110	0	15	M1

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REPORT OF LABORATORY ANALYSIS

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QUALIFIERS

Project: FabraCare Fort Valley GA
Pace Project No.: 2620646

DEFINITIONS

DF - Dilution Factor, if reported, represents the factor applied to the reported data due to dilution of the sample aliquot.

ND - Not Detected at or above adjusted reporting limit.

J - Estimated concentration above the adjusted method detection limit and below the adjusted reporting limit.

MDL - Adjusted Method Detection Limit.

PQL - Practical Quantitation Limit.

RL - Reporting Limit - The lowest concentration value that meets project requirements for quantitative data with known precision and bias for a specific analyte in a specific matrix.

S - Surrogate

1,2-Diphenylhydrazine decomposes to and cannot be separated from Azobenzene using Method 8270. The result for each analyte is a combined concentration.

Consistent with EPA guidelines, unrounded data are displayed and have been used to calculate % recovery and RPD values.

LCS(D) - Laboratory Control Sample (Duplicate)

MS(D) - Matrix Spike (Duplicate)

DUP - Sample Duplicate

RPD - Relative Percent Difference

NC - Not Calculable.

SG - Silica Gel - Clean-Up

U - Indicates the compound was analyzed for, but not detected.

N-Nitrosodiphenylamine decomposes and cannot be separated from Diphenylamine using Method 8270. The result reported for each analyte is a combined concentration.

Pace Analytical is TNI accredited. Contact your Pace PM for the current list of accredited analytes.

TNI - The NELAC Institute.

LABORATORIES

PASI-C	Pace Analytical Services - Charlotte
PASI-GA	Pace Analytical Services - Atlanta, GA
PASI-O	Pace Analytical Services - Ormond Beach

ANALYTE QUALIFIERS

D6	The precision between the sample and sample duplicate exceeded laboratory control limits.
H1	Analysis conducted outside the EPA method holding time.
M1	Matrix spike recovery exceeded QC limits. Batch accepted based on laboratory control sample (LCS) recovery.
S0	Surrogate recovery outside laboratory control limits.
S3	Surrogate recovery exceeded laboratory control limits. Analyte presence below reporting limits in associated sample.

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QUALITY CONTROL DATA CROSS REFERENCE TABLE

Project: FabraCare Fort Valley GA
Pace Project No.: 2620646

Lab ID	Sample ID	QC Batch Method	QC Batch	Analytical Method	Analytical Batch
2620646001	GW-014918-070919-SAG-004	RSK 175 Modified	486116		
2620646002	GW-014918-070919-SAG-005	RSK 175 Modified	486268		
2620646003	GW-014918-070919-SAG-006	RSK 175 Modified	486116		
2620646007	GW-014918-070919-DJB-107	RSK 175 Modified	486116		
2620646008	GW-014918-070919-DJB-108	RSK 175 Modified	486116		
2620646001	GW-014918-070919-SAG-004	EPA 3010A	31653	EPA 6010D	31664
2620646002	GW-014918-070919-SAG-005	EPA 3010A	31653	EPA 6010D	31664
2620646003	GW-014918-070919-SAG-006	EPA 3010A	31653	EPA 6010D	31664
2620646007	GW-014918-070919-DJB-107	EPA 3010A	31653	EPA 6010D	31664
2620646008	GW-014918-070919-DJB-108	EPA 3010A	31653	EPA 6010D	31664
2620646001	GW-014918-070919-SAG-004	EPA 3010A	31652	EPA 6010D	31663
2620646002	GW-014918-070919-SAG-005	EPA 3010A	31652	EPA 6010D	31663
2620646003	GW-014918-070919-SAG-006	EPA 3010A	31652	EPA 6010D	31663
2620646007	GW-014918-070919-DJB-107	EPA 3010A	31652	EPA 6010D	31663
2620646008	GW-014918-070919-DJB-108	EPA 3010A	31652	EPA 6010D	31663
2620646001	GW-014918-070919-SAG-004	EPA 8260B	31641		
2620646002	GW-014918-070919-SAG-005	EPA 8260B	31641		
2620646003	GW-014918-070919-SAG-006	EPA 8260B	31641		
2620646004	GW-014918-070919-SAG-007	EPA 8260B	31641		
2620646005	GW-014918-070919-DJB-105	EPA 8260B	31641		
2620646006	GW-014918-070919-DJB-106	EPA 8260B	31641		
2620646007	GW-014918-070919-DJB-107	EPA 8260B	31641		
2620646008	GW-014918-070919-DJB-108	EPA 8260B	31641		
2620646009	GW-014918-071019-DJB-109	EPA 8260B	31641		
2620646010	GW-014918-071019-DJB-110	EPA 8260B	31641		
2620646011	Trip Blank	EPA 8260B	31641		
2620646001	GW-014918-070919-SAG-004	SM 4500-P	31619		
2620646002	GW-014918-070919-SAG-005	SM 4500-P	31619		
2620646003	GW-014918-070919-SAG-006	SM 4500-P	31619		
2620646007	GW-014918-070919-DJB-107	SM 4500-P	31619		
2620646008	GW-014918-070919-DJB-108	SM 4500-P	31619		
2620646001	GW-014918-070919-SAG-004	SM 4500-S2 D	31696		
2620646002	GW-014918-070919-SAG-005	SM 4500-S2 D	31696		
2620646003	GW-014918-070919-SAG-006	SM 4500-S2 D	31696		
2620646007	GW-014918-070919-DJB-107	SM 4500-S2 D	31696		
2620646008	GW-014918-070919-DJB-108	SM 4500-S2 D	31723		
2620646001	GW-014918-070919-SAG-004	EPA 350.1	31634		
2620646002	GW-014918-070919-SAG-005	EPA 350.1	31634		
2620646003	GW-014918-070919-SAG-006	EPA 350.1	31634		
2620646007	GW-014918-070919-DJB-107	EPA 350.1	31634		
2620646008	GW-014918-070919-DJB-108	EPA 350.1	31634		
2620646001	GW-014918-070919-SAG-004	SM 5310B	553762		
2620646002	GW-014918-070919-SAG-005	SM 5310B	553762		
2620646003	GW-014918-070919-SAG-006	SM 5310B	553762		

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QUALITY CONTROL DATA CROSS REFERENCE TABLE

Project: FabraCare Fort Valley GA
Pace Project No.: 2620646

Lab ID	Sample ID	QC Batch Method	QC Batch	Analytical Method	Analytical Batch
2620646007	**GW-014918-070919-DJB-107**	SM 5310B	553762		
2620646008	**GW-014918-070919-DJB-108**	SM 5310B	553762		
2620646001	**GW-014918-070919-SAG-004**	EPA 9056A	31617		
2620646002	**GW-014918-070919-SAG-005**	EPA 9056A	31617		
2620646003	**GW-014918-070919-SAG-006**	EPA 9056A	31617		
2620646007	**GW-014918-070919-DJB-107**	EPA 9056A	31642		
2620646008	**GW-014918-070919-DJB-108**	EPA 9056A	31642		
2620646001	**GW-014918-070919-SAG-004**	EPA 9056A	31889		
2620646002	**GW-014918-070919-SAG-005**	EPA 9056A	31889		
2620646003	**GW-014918-070919-SAG-006**	EPA 9056A	31889		
2620646007	**GW-014918-070919-DJB-107**	EPA 9056A	31889		
2620646008	**GW-014918-070919-DJB-108**	EPA 9056A	31889		

CHAIN-OF-CUSTODY / Analytical Request Document

The Chain-of-Custody is a LEGAL DOCUMENT. All relevant fields must be completed accurately.

Pace Analytical

Page : 1 Of 1

Section A — Required Client Information:

Company:	GHD
Address:	3075 Breckinridge Blvd
	Duluth, GA 30096
Email:	kelly.blanchard@ghd.com
Phone: (770)441-0027	Fax:
Requested Due Date:	

Section B — Required Project Information:

Report To:	Kelly Blanchard
Copy To:	
Purchase Order #:	See SSOW
Project Name:	FabraCare Fort Valley GA
Project #:	

Section C — Invoice Information:

Attention:	See SSOW
Company Name:	
Address:	
Pace Quote:	
Pace Project Manager:	betsy.mcdaniel@pacelabs.com,
Pace Profile #:	1681

Regulatory Agency: —

State / Location: GA

SAMPLE ID
One Character per box. (A-Z, 0-9 / , -)
Sample Ids must be unique

MATRIX	CODE
Drinking Water	DW
Water	WT
Waste Water	WW
Product	P
Soil/Solid	SL
Oil	OL
Wipe	WP
Air	AR
Other	OT
Tissue	TS

ITEM #	SAMPLE ID	MATRIX CODE (see valid codes to left)	SAMPLE TYPE (G=GRAB C=COMP)	COLLECTED START DATE	COLLECTED START TIME	COLLECTED END DATE	COLLECTED END TIME	SAMPLE TEMP AT COLLECTION	# OF CONTAINERS	Preservatives: Unpreserved	H2SO4	HNO3	HCl	NaOH	Na2S2O3	Methanol	Other 2mAc	Analyses Test Y/N	VOC by 8260	1,4-Dioxane by 8260 MS/MSD	Metals (Fe, Mn)	Dissolved Metals by 6010 (F	ammonia	Ortho Phosphorus	Nitrate, Sulfate	Total Organic Carbon	Methane, Ethane, and Ether	Sulfide	Trip BLANK	Residual Chlorine (Y/N)	Requested Analysis Filtered (Y/N)	
1	~~MW-1~~ GW-014918-070919-SAG-004	WT		7/9/19	0900				15	4	2	2	5				2		x		x	x	x	x	x	x	x			RW-4	1
2	~~MW-2~~ GW-014918-070919-SAG-005	WT			1105				15	4	2	2	5				2		x		x	x	x	x	x	x	x			RW-3	2
3	~~MW-3~~ GW-014918-070919-SAG-006	WT			1316				15	4	2	2	6				2		x		x	x	x	x	x	x	x			RW-4	3
4	~~MW-3R~~ GW-014918-071019-SAG-007	WT		7/10/19	840				3			0	3						x		~~x~~	~~x~~	~~x~~	~~x~~	~~x~~	~~x~~	~~x~~			MW-2	4
5	~~MW-4B~~ GW-014918-070919-DJB-105	WT		7/9/19	8:5				9				9						x	X	~~x~~	~~x~~	~~x~~	~~x~~	~~x~~	~~x~~	~~x~~			EPD-3b	5
6	RW-1 GW-014918-070919-DJB-106	WT		7/9/19	955				3				3						x		~~x~~	~~x~~	~~x~~	~~x~~	~~x~~	~~x~~	~~x~~			EPD-3A	6
7	RW-2 GW-014918-070919-DJB-107	WT		7/9/19	12:30				15	4	2	2	5				2		x		x	x	x	x	x	x	x			MW-11b	7
8	RW-3 GW-014918-070919-DJB-108	WT		7/9/19	16:30				15	4	2	2	5				2		x		x	x	x	x	x	x	x			PZ-2R	8
9	~~RW-4~~ GW-014918-071019-DJB-109	WT		7/10/19	3:30				3				3						x		~~x~~	~~x~~	~~x~~	~~x~~	~~x~~	~~x~~	~~x~~			PZ-1	9
10	~~RW-5~~ GW-014918-071019-DJB-110	WT		7/10/19	9:30				3				3						x		~~x~~	~~x~~	~~x~~	~~x~~	~~x~~	~~x~~	~~x~~			MW-3	10
11	PZ-1	WT																	x		x	x	x	x	x	x	x			Trip Blank CH 7/10/19	11
12	PZ-2R	WT																	x		x	x	x	x	x	x	x				12

ADDITIONAL COMMENTS	RELINQUISHED BY / AFFILIATION	DATE	TIME	ACCEPTED BY / AFFILIATION	DATE	TIME	SAMPLE CONDITIONS			
	David Brytowski	7/10/19	13:40	Chandra Hunter	7/10/19	1340	1.9	4	Y	Y

WO# : 2620646

2620646

SAMPLER NAME AND SIGNATURE

PRINT Name of SAMPLER: David Brytowski

SIGNATURE of SAMPLER: David Brytowski DATE Signed: 7/10/19

TEMP in C	Received on Ice (Y/N)	Custody Sealed Cooler (Y/N)	Samples Intact (Y/N)

Sample Condition Upon Receipt

Pace Analytical

Client Name: GHD

WO#: 2620646

Due Date: 07/17/19

PM: BM

CLIENT: GHD

Courier: ☐ Fed Ex ☐ UPS ☐ USPS ☑ Client ☐ Commercial ☐ Pace Other

Tracking #: _____

Custody Seal on Cooler/Box Present: ☐ yes ☐ no Seals intact: ☑ yes ☐ no

Packing Material: ☐ Bubble Wrap ☑ Bubble Bags ☐ None ☐ Other _____

Thermometer Used 082

Type of Ice: (Wet) Blue None ☐ Samples on ice, cooling process has begun

Cooler Temperature 1.9°C

Biological Tissue is Frozen: Yes No

Date and Initials of person examining contents: 7/10/19 CO24

Temp should be above freezing to 6°C

Comments:

Chain of Custody Present:	☑Yes	☐No	☐N/A	1.
Chain of Custody Filled Out:	☑Yes	☐No	☐N/A	2.
Chain of Custody Relinquished:	☑Yes	☐No	☐N/A	3.
Sampler Name & Signature on COC:	☑Yes	☐No	☐N/A	4.
Samples Arrived within Hold Time:	☑Yes	☐No	☐N/A	5.
Short Hold Time Analysis (<72hr):	☑Yes	☐No	☐N/A	6.
Rush Turn Around Time Requested:	☐Yes	☑No	☐N/A	7.
Sufficient Volume:	☑Yes	☐No	☐N/A	8.
Correct Containers Used:	☑Yes	☐No	☐N/A	9.
-Pace Containers Used:	☑Yes	☐No	☐N/A	
Containers Intact:	☑Yes	☐No	☐N/A	10.
Filtered volume received for Dissolved tests	☑Yes	☐No	☐N/A	11. Mets field Filtered + preg
Sample Labels match COC:	☑Yes	☐No	☐N/A	12.
-Includes date/time/ID/Analysis Matrix: GW				
All containers needing preservation have been checked.	☑Yes	☐No	☐N/A	13.
All containers needing preservation are found to be in compliance with EPA recommendation.	☑Yes	☐No	☐N/A	
exceptions: VOA, coliform, TOC, O&G, WI-DRO (water)	☑Yes	☐No		Initial when completed / Lot # of added preservative
Samples checked for dechlorination:	☐Yes	☐No	☑N/A	14.
Headspace in VOA Vials (>6mm):	☐Yes	☑No	☐N/A	15.
Trip Blank Present:	☑Yes	☐No	☐N/A	16. Trip Blank present but not listed on COC
Trip Blank Custody Seals Present	☑Yes	☐No	☐N/A	
Pace Trip Blank Lot # (if purchased): _____				

Client Notification/ Resolution: Field Data Required? Y / N

Person Contacted: _____ Date/Time: _____

Comments/ Resolution: _____

Project Manager Review: _____ **Date:** _____

Note: Whenever there is a discrepancy affecting North Carolina compliance samples, a copy of this form will be sent to the North Carolina DEHNR Certification Office (i.e out of hold, incorrect preservative, out of temp, incorrect containers)

Appendix D
Review of Monitoring Data after the July 2019 Monitoring Event Memo

Memorandum

September 6, 2019

To:	Matt Talbert	Ref. No.:	014918
From:	Sophia Dore/adh/24	Tel:	716-205-1978
cc:	Terefe Mazengia		

Subject: **Review of Monitoring Data After the July 2019 Monitoring Event FabraCare Cleaners, Fort Valley, Georgia**

1. Introduction

Emulsified vegetable oil (EVO) has been used to stimulate biodegradation at FabraCare Cleaners, Fort Valley, Georgia (Site). EVO was injected in September 2013 and in April 2016. In November 2018, EHC-L was injected between 21 to 23 feet below ground surface (bgs) and 27 to 28 feet bgs at each of 16 direct push technology (DPT) points. The EHC-L reagent injected at each well consisted of 25 gallons of ELS MicroEmulsion and 2.5 bags of EHC Liquid Mix mixed with 350 gallons of water. This material was injected followed by 20 gallons of chase water at each point. Pre-injection monitoring occurred in February 2016. Post-injection monitoring was performed in July 2016, January 2017, July 2017, January 2018, July 2018, and January and July 2019. This memo contains an evaluation of the in situ enhanced biodegradation (ISEB) treatment to date based on these monitoring data.

2. Groundwater Monitoring

Groundwater monitoring was performed in February 2016, prior to the EVO injection and in July 2016, January 2017, July 2017, January 2018, July 2018, and January and July 2019 approximately 6 months, 1 year, 18 months, and 2 years after the 2016 EVO injection and then approximately 3 months, 9 months and 15 months after the April 2018 EHC-L injection. Monitoring was performed at wells MW-1, MW-2, and MW-3, which are located along the property boundary at the periphery of the treatment area; well MW-11B, which is a deep well screened much deeper than the treatment intervals; and at wells RW-1, RW-2, RW-3, RW-4, and RW-5, which are located within the treatment area. Monitoring was also performed at off-Site wells PZ-1 and PZ-2R. Monitoring was performed for volatile organic compounds (VOC), dissolved gases, pH, oxidation-reduction potential (ORP), dissolved oxygen (DO), as well as general chemistry parameters. In addition, a microbial analysis for bacteria associated with the degradation of chlorinated solvents was performed on samples from wells RW-2, RW-3, RW-4, and MW-11B in July 2019.

GHD
2055 Niagara Falls Boulevard Niagara Falls New York 14304 USA
T 716 297 6150 F 716 297 2265 W www.ghd.com

3. Assessment of Groundwater Monitoring Results

3.1 Volatile Organic Compounds

At well MW-1, which is located in the western corner of the Site, both tetrachloroethene (PCE) and trichloroethene (TCE) had been reduced to below their 5-micrograms per liter (µg/L) Maximum Contaminant Level (MCL) by the previous round of injections in July 2015 but had rebounded to above their MCL by February 2016. The 2016 injection resulted in an 83-percent reduction in PCE from February 2016 levels; however, concentrations of TCE did not decrease. Rebound in the PCE concentration was again observed between January 2017 and January 2018, and TCE concentrations also increased during this time period. In January 2017, PCE concentrations had increased to close to their February 2016 levels, and by July 2017, the PCE concentration was higher than in February 2016. The PCE concentration continued to increase through January 2018. In both January and July 2017 and January 2018, TCE concentrations were higher than they were in February 2016. Increased concentrations of cis-1,2-dichloroethene (cis-1,2-DCE) corresponded to periods when PCE and/or TCE were decreasing. In July 2018, concentrations of PCE and TCE decreased accompanied by an increase in cis-1,2-DCE. By January 2019, 2 months after the EHC-L injection, PCE had also been reduced to below its MCL, and TCE had been reduced to non-detect levels. A 70-percent reduction in the concentration of cis-1,2-DCE was also observed although it remained well above its MCL. A slight increase in vinyl chloride to just above its MCL was observed in January 2019, which is likely related to the decreased concentration of cis-1,2-DCE. In July 2019, PCE and TCE remained below their MCLs, and vinyl chloride was reduced to below its MCL. The concentration of cis-1,2-DCE increased, however. cis-1,2-DCE is now the only compound present in this well above its MCL.

At well MW-2, which is located at the northeastern edge of the property, a decrease in PCE and TCE concentrations was observed after the first EVO injection; however, by July 2016, concentrations had rebounded. Further reductions in the concentrations of PCE and TCE were observed after the second EVO injection; however, degradation had slowed by July 2017, and concentrations of cis-1,2-DCE were increasing. In July 2018, a 20-percent reduction in the concentration of PCE, a 46-percent reduction in the concentration of TCE, and a 56-percent reduction in the concentration of cis-1,2-DCE were observed. In January 2019, after the EHC-L injections, PCE and TCE were not detected in this well, however, the detection limit reached was elevated. The concentration of cis-1,2-DCE also decreased slightly. In July 2019, no VOC were detected in this well; however, the detection limit was estimated due to analytical issues.

At well MW-3, a large increase in the concentration of PCE was observed in July but showed a decreasing trend until July 2017, while concentrations of TCE and cis-1,2-DCE increased. In January 2018, a 65-percent reduction in the concentration of PCE was observed along with a small (24 percent) reduction in the concentration of TCE; however, the concentration of cis-1,2-DCE continued to increase. In July 2018, concentrations of PCE, TCE, and cis-1,2-DCE increased again. In January 2019, after the EHC-L injections, concentrations of PCE and TCE had decreased with PCE showing a 98-percent reduction and TCE showing a 78-percent reduction over July 2018 levels. Both PCE and TCE concentrations remained above their MCLs. The concentration of cis-1,2-DCE continued to increase. In July 2019, no VOC were detected in this well.

Well MW-11B is a deep well not screened within the perched aquifer that was treated, and no effects of the EVO injections were anticipated and none were observed at this well either after the 2013 injections or after the 2016 injections. In July 2017, a 65-percent reduction in the concentration of PCE was observed at this well. Concentrations of TCE and cis-1,2-DCE remained stable. In January 2018, small reductions in the concentrations of PCE, TCE, and cis-1,2-DCE were observed. In July 2018, a 90-percent reduction in the concentration of PCE was observed; however, by January 2019, this concentration had rebounded to January 2018 levels. A slight decrease in concentrations of PCE, TCE, and cis-1,2-DCE was observed in July 2019.

Wells RW-1, RW-2, and RW-3 are located within the treatment area to the northwest of the building. Large decreases in the concentrations of PCE and TCE were observed at all of these wells since the September 2013 EVO injection. At RW-1, greater than 99 percent removal of PCE and TCE was observed after the 2013 injections with both compounds treated to below their MCL. Concentrations of both compounds had rebounded slightly by the February 2016 injection, but at the July 2016 event, the concentrations had decreased again. By July 2017, concentrations of PCE and TCE in RW-1 had been reduced to non-detect levels; however, an increase in the concentration of cis-1,2-DCE was observed. In January 2018, a slight rebound in the concentration of PCE to 10 µg/L was observed, while the concentration of TCE remained at non-detect levels. In July 2018, the concentration of PCE was reduced to below its MCL and remained there through January 2019. A small increase in TCE was observed in July 2018, but by January 2019 after the EHC-L injection, TCE was at non-detect levels in this well. The concentration of cis-1,2-DCE also increased in July 2018 but decreased by 76 percent in January 2019 after the EHC-L injection. A further 27-percent decrease in cis-1,2-DCE was observed in July 2019. cis-1,2-DCE is the only compound remaining in this well above its MCL.

At RW-2, greater than 98 percent removal of PCE and TCE was observed after the 2013 injections. However, by July 2015, some rebound had been observed. Concentrations of PCE had decreased again after the second injection event but increased again through 2017 and at the January 2018 monitoring event. Concentrations of TCE remained at non-detect levels, while concentrations of cis-1,2-DCE were above the MCL. PCE decreased to below its MCL in July 2018 and to non-detect levels in January 2019 after the EHC-L injection. TCE remained at non-detect levels; however, the concentration of cis-1,2-DCE showed a sharp increase in January 2019, and vinyl chloride was also detected at above its MCL at this event. Reductions in cis-1,2-DCE and vinyl chloride were observed in July 2019; however, concentrations of these compounds remained above their MCLs.

At well RW-3, both PCE and TCE had been treated to below their MCL in July 2015 but had rebounded slightly by February 2016, but were again reduced to below their MCL by July 2017. The concentration of cis-1,2-DCE remained well above its MCL. A slight increase in PCE was observed to above its MCL in July 2018. After the EHC-L injections, PCE decreased to below its MCL by January 2019. TCE remained below its MCL. The concentration of cis-1,2-DCE increased in July 2018 but had decreased in January 2019, although it remained above its January 2018 level and above its MCL. Vinyl chloride was detected in July 2018 and January 2019 but has remained below its MCL. A 50-percent reduction in the concentration of cis-1,2-DCE was observed in July 2019; however, it remained above its MCL. Vinyl chloride continued to be detected but remained below its MCL.

At well RW-4, after the 2013 injection event, 75 percent removal of PCE and 66 percent removal of TCE were observed, and after the second EVO injection event, concentrations of both PCE and TCE were reduced to below the MCL. An increase in the concentration of cis-1,2-DCE was observed, and cis-1,2-DCE continued to increase in January 2017 when it began to decrease. In January 2018, PCE and TCE remained at non-detect levels, and cis-1,2-DCE continued to decrease. After the EHC-L injections, concentrations of PCE and TCE remained below their MCLs; however, a slight increase in the concentration of cis-1,2-DCE was observed. Concentrations of cis-1,2-DCE and vinyl chloride increased slightly in July 2019.

At well RW-5, the 2013 injections resulted in the reduction of PCE concentrations by 99 percent and TCE concentrations by 93 percent. By July 2015, significant rebound had occurred. No significant reduction in PCE or TCE concentrations has been observed in this area as a result of the April 2016 injections. In July 2018, concentrations of PCE, TCE, and cis-1,2-DCE showed slight decreases in this well. In January 2019, after the EHC-L injections, a 26-percent reduction in the concentration of PCE and a 61-percent reduction in the concentration of TCE were observed. The concentration of cis-1,2-DCE decreased in July 2018 but increased again in January 2019 after the EHC-L injection. Vinyl chloride was also detected above its MCL in January 2019. In July 2019, concentrations of PCE and TCE were reduced to below their MCLs. A slight increase in cis-1,2-DCE and a slight decrease in vinyl chloride were also observed. Concentrations of cis-1,2-DCE and vinyl chloride remained above their MCLs.

Well PZ-1 is located off Site, outside the injection area. Concentrations at well PZ-1 have fluctuated over the last 4 years, but no clear trends were observed after any of the injection events. A 46-percent reduction in the concentration of PCE was observed in January 2019 after the November 2018 injection of EHC-L, and a further 68-percent reduction in PCE concentration was observed in July 2019. No daughter products were detected. It appears that concentrations of PCE in this location are now decreasing.

PZ-2R was a new well installed in February 2016 to replace former monitoring well PZ-2. Like PZ-1, this well is located off Site, outside the injection area. Concentrations of TCE and cis-1,2-DCE have been below their MCLs since the well was installed. An increase in the concentration of PCE was observed between February and July 2016, and PCE concentrations remained stable at this level until July 2017 when concentrations started to decrease. PCE concentrations decreased through January 2018; however, increases in the PCE concentration were observed in July 2018 and January 2019. A 57-percent reduction in the PCE concentration was observed in July 2019. Further monitoring data is required to determine whether this decrease is sustained.

1,4-dioxane was monitored in selected wells at the 2017 and 2018 monitoring events. Low levels of 1,4-dioxane were detected in well RW-4 at the January and July 2017 monitoring events but had been reduced to non-detect levels by the January 2018 monitoring event and remained at non-detect levels in July 2018. There were no other detections of 1,4-dioxane. 1,4-dioxane was not monitored at either of the 2019 events.

These data show that reductive dechlorination enhanced by the November 2018 injection of EHC-L has caused a reduction in chlorinated volatile organic compounds (CVOC) concentrations in the areas of wells MW-1, MW-2, MW-3, RW-1, RW-2, RW-3, RW-4, RW-5, and possibly PZ-1 and PZ-2R. The rebound observed prior to the injections has been reversed in most wells. Some increased concentrations of daughter

products cis-1,2-DCE and vinyl chloride were observed; however, in most wells these concentrations appear to be decreasing.

3.2 Dissolved Gases

Concentrations of dissolved ethane, ethene, and methane were measured during the July 2016, January and July 2017, January and July 2018, and January and July 2019 monitoring events. Ethane and ethene are non-chlorinated end products of reductive dechlorination, and methane is produced only under very anaerobic conditions and is used as an indicator that anaerobic conditions have been established.

No ethene or ethane were observed at any of the monitoring wells in July 2016 or January 2017; however, in July 2017, low levels of ethene were observed in wells RW-3 and RW-4. No gases were observed in July 2018; however, in January 2019, after the EHC-L injections, ethene was observed in wells MW-1, RW-2, and RW-3. These gases are extremely volatile and do not remain in groundwater. Therefore, they are often not detected even when they are being produced, and detections suggest that large quantities of ethene are being produced; therefore, these data indicate that a large amount of complete dechlorination is occurring in wells MW-1, RW-2, and RW-3. Ethene and ethane were not detected in any of the wells in July 2019; however, by this time, only cis-1,2-DCE and small amounts of vinyl chloride were present in wells that had previously had detections of ethene and ethane, therefore, degradation may have been slower.

In July 2016, significant quantities of methane were observed at wells MW-1, MW-2, RW-1, RW-2, and RW-3; lesser concentrations were observed at wells RW-4 and RW-5 at the July 2016 monitoring event. In January 2017, the methane concentration at wells MW-1 and MW-2 had decreased significantly. Methane concentrations remained high at wells RW-1, RW-2, and RW-3 and had increased at well RW-4. The methane concentration had decreased at well RW-5. In July 2017 and January 2018, methane concentrations remained moderate at wells MW-1, MW-2, and RW-5 and high in wells RW-1, RW-2, RW-3, and RW-4. In January 2019, after the EHC-L injections, high concentrations of methane were observed in wells MW-1, MW-2, RW-1, RW-2, and RW-3. Moderate concentrations of methane were present in wells MW-3, MW-5R, RW-4, and RW-5. Methane concentrations were similar in July 2019.

3.3 Field Measurements

Field data including pH, DO, and ORP were at all monitoring events from all wells that contained sufficient water. pH is naturally low at the Site, and pH levels ranging from 4.9 to 6.3 were observed at the February 2016 monitoring event. At the April 2016 monitoring event, sodium bicarbonate was added to the injection solution as a buffer, and at the July 2016 monitoring event, pH values were somewhat higher than previously observed ranging from pH 5.5 to 6.95. pH values remained above 5.5, which is the range where reductive dechlorination can occur through 2018 and also remained in this range in January and July 2019 after the EHC-L injection event showed that the most recent injections did not cause pH to drop in the injection area.

DO values were low at all monitoring events. At the February 2016 monitoring event, DO values ranged from 0 milligram per liter (mg/L) to 1.2 mg/L. At the July 2016 event, DO values ranged from 0 to 2.6 mg/L. DO values in January 2017 were low, with most being below 1 mg/L and in July 2017 and January 2018, all DO values except for well MW-11B were below 1 mg/L. In July 2018, DO values above 1 mg/L were also

recorded in wells MW-3 and PZ-2R. In January 2019, DO values greater than 1 mg/L were recorded in wells MW-11B, PZ-2R, RW-2, and RW-5; however, the values for wells RW-2 and RW-5, which are located within the injection area, were likely influenced by the perturbation from the injection, as the DO in these wells had returned to below 1 mg/L by July 2019. The DO in MW-11B and PZ-2R remained above 1 mg/L.

A significant drop in ORP values was observed between February and July 2016 after the first injection event. In February 2016, ORP values ranged from -70 to 133 millivolts (mV), while in July 2016, ORP values for wells MW-1 and RW-1 through RW-4 were all less than -97 mV. The ORP for well RW-5 was 54 mV. These data suggest that conditions became significantly more anaerobic after the April 2016 injections at all wells monitored except well RW-5. In January 2017, ORP values ranged from -28 to -133 mV in wells MW-1 and RW-1-4. ORP in well MW-2 was 125 mV and in well RV-5 was139 mV. This data suggests that anaerobic conditions were still present in wells MW-1 and RW-1-4 but less anaerobic in wells MW-2 and RW-5. In July 2017, ORP values were below -150 mV in all wells except RW-5 and MW-11B. These data suggest that anaerobic conditions have been established throughout most of the treatment zone. In January 2018, ORP values were generally higher than they had been in July 2017 with no values below -100 mV. However, negative ORP values suggesting anaerobic conditions were observed in all wells except wells MW-2, MW-11B, and RW-5. These data suggest that conditions were less anaerobic in January 2018 than they had been in July 2017. In July 2018, conditions became even less aerobic with positive ORP values in wells MW-2, MW-3, MW-11B, PZ-2R, and RW-5. However, in January and July 2019, negative ORP values were again observed in all wells except MW-11B and PZ-2R, which are outside of the injection area/depth interval. These data confirm that conditions became more anaerobic after the EHC-L injections.

3.4 General Chemistry

General chemistry parameters measured included ammonia-nitrogen, phosphorus, total and dissolved iron, manganese, nitrate, sulfate, sulfide, and total organic carbon (TOC). These parameters were monitored during the July 2016, January and July 2017, January and July 2018, and January 2019 monitoring events. In January 2017, these parameters were not measured in well PZ-1 due to insufficient water in the well, and in January 2018, these parameters were not monitored in wells MW-3 and PZ-1 due to insufficient water.

At the July 2016 monitoring event, ammonia-nitrogen was detected at wells MW-1, RW-1, RW-2, and RW-3 with the highest concentrations of ammonia-nitrogen present in wells MW-1 and RW-1. In January 2017, concentrations of ammonia-nitrogen had decreased at wells MW-1 and RW-1, and the highest concentration of ammonia-nitrogen was now detected at well RW-4. Since an ammonia-nitrogen source was part of the injected material, these detections suggest that some of the injected material has now reached well RW-4. In July 2017, concentrations of ammonia-nitrogen had decreased in all wells; however, low concentrations remained in wells MW-1, RW-1, RW-2, RW-3, and RW-4. In January and July 2018, all ammonia-nitrogen concentrations were below 1 mg/L. Detectable ammonia-nitrogen was present in wells MW-1 and RW-1, RW-2, RW-3, and RW-4 during the 2018 events. Increases in ammonia-nitrogen were observed after the EHC-L injections. In January 2019, ammonia-nitrogen was present at above 1 mg/L in wells MW-1, MW-3, RW-1, RW-2, and RW-5. Ammonia-nitrogen was not injected in November 2018, therefore, this increase in ammonia-nitrogen must be naturally occurring. In July 2019, ammonia-nitrogen was not monitored in wells MW-3 or RW-1 but remained above 1 mg/L in wells MW-1 and RW-5.

Phosphorus was not detected at any of the wells until January 2018. At this sampling event, a low concentration of orthophosphate-phosphorus was detected in well RW-5. A small amount of phosphate was added with the injected material, but it may have been consumed and/or diluted to below the analytical detection limit before it reached most of the wells. Orthophosphate had returned to non-detect levels in July 2018 but was detected in January 2019 at low levels in wells MW-3 and RW-2 and at a higher concentration at RW-5. Orthophosphate was not injected in November 2018, therefore, this increase in orthophosphate must be naturally occurring. MW-3 was not monitoring for phosphate in July 2019, however, the concentrations of phosphate at RW-2 and RW-5 have been reduced to non-detect levels by July 2019.

High dissolved iron concentrations were not observed at the July 2016 monitoring event. In the January and July 2017 monitoring event, concentrations of dissolved iron similar to the total iron concentrations were observed in wells MW-1, RW-1, RW2, RW-3, and RW-4. In January and July 2018, concentrations of dissolved iron similar to the total iron concentrations were observed in all wells except MW-11B and PZ-2R. In January and July 2019, after the EHC-L injections, increased concentrations of iron were observed in all wells except wells MW-11B, PZ-1, and PZ-2R, which are located outside the injection area/depth interval. The EHC-L reagent contains soluble iron, therefore, this increase is expected. In all the wells where increased iron was observed, total and dissolved iron were at similar levels. Iron and manganese are more soluble under reducing conditions; therefore, the iron data support the conclusion that highly reducing conditions are present in many wells at the Site. The manganese at all of the wells appeared to be predominantly in the dissolved form.

In July 2016, nitrate was detected at wells MW-2, MW-11B, and PZ-2R. In January 2017, it was detected in wells MW-2, MW-3, MW-11B, PZ-2R, and RW-2; and in July 2017, it was detected in wells MW-3, MW-11B, and PZ-2R. In January and July 2018, nitrate was detected in wells MW-2, MW-11B, and PZ-2R; and in January 2019, nitrate was detected in wells MW-11B, PZ-1, and PZ-2R. Nitrate is used as an electron acceptor when oxygen concentrations become depleted. The presence of nitrate at these wells showed that it had not been consumed and, therefore, highly anaerobic conditions were not present in the areas of these wells. This is expected for well MW-11B since injections did not target the zone in which this well is screened, and for wells PZ-1 and PZ-2R, which are located off Site outside the injection area.

Sulfate concentrations were low at all wells except wells MW-2 and RW-4. In January 2017, sulfate concentrations decreased in wells MW-1, MW-2, RW-1, and RW-4. By July 2017, sulfate had been reduced to non-detect levels in wells MW-1, RW-2, RW-3, and RW-4. During the July 2016 monitoring event, small amounts of sulfide were detected at all wells. No sulfide was detected in January or July 2017. In January and July 2018, sulfate was detected in wells MW-2, MW-3, PZ-2R, and RW-5. By January and July 2019, sulfate was detected in wells PZ-1, PZ-2R, and RW-5 only. Under reducing conditions, sulfate reducing bacteria (SRB) convert sulfate to sulfide; however, sulfide is not soluble in water and quickly precipitates out of groundwater. These data suggest that highly anaerobic conditions are present through much of the treatment area and have become more anaerobic since the EHC-L injections.

In July 2016, TOC was not detected at any of the wells except MW-11B. These data suggest that the EVO that was injected had not yet moved into the areas of the monitoring wells. In January 2017, TOC was detected in wells MW-1, MW-11B, PZ-2R, RW-3, and RW-4. MW-1 and RW-4 had the highest concentrations of TOC. In July 2017, TOC had decreased in all wells with the higher remaining

concentrations present in RW-4. By January 2017, TOC was detected only in wells MW-11B, and RW-1, RW-2, RW-3, RW-4, and RW-5. Well RW-4 was the only well with a TOC greater than 5 mg/L. This data shows that the EVO migrated to areas outside the injection wells but has been largely consumed. After the November 2018 injection event, TOC concentrations increased in all wells except MW-11B, PZ-1, PZ-2R, RW-3, and RW-4. It is possible that the carbon in the area of wells RW-3 and RW-4 had been consumed since the other data suggests that the injected material reached these wells. In July 2019, reductions in the TOC concentration were observed at wells MW-1, RW-1, RW-2, and RW-5. These data indicate that organic carbon is being consumed.

Metabolic acids were measured in January and July 2017 and in January 2018; however, no metabolic acids were observed in any of the monitoring wells. However, the lower TOC levels and the increasingly anaerobic conditions indicate that breakdown of the EVO is occurring. In January 2019, metabolic acids were present in all wells with high concentrations present in wells MW-1, MW-2, and RW-1. Metabolic acids concentrations in wells PZ-1, PZ-2R, RW-3, and RW-4 were very low. In July 2019, metabolic acids were detected only in wells RW-5 and PZ-2R. These data show that the EHC-L material injected in November 2018 is being broken down. The presence of metabolic acids at low levels in wells PZ-1, RW-5, and PZ-2R indicates that some of the material resulting from the injections is being carried downgradient and has not been completely broken down in the downgradient wells.

3.5 Microbial Analysis

Quantitative polymerase chain reaction (QPCR) analyses were performed on samples from wells RW-2, RW-3, RW-4, and MW-11B for quantify Dehalococcoides (DHC) bacteria in these wells. DHC are bacteria known to be able to dechlorinate PCE all the way to ethene. No DHC organisms were found in any of the wells.

3.6 Groundwater Levels

Overall, these data suggest that biodegradation of CVOC occurred as a result of the April 2016 and November 2018 injection events. Dispersal after the April 2016 event was slow due to low groundwater levels. Groundwater levels at the Site dropped by approximately 1 foot between the February 2016 and July 2016 monitoring events. Groundwater levels had risen somewhat by January 2017 and rose further by the July 2017 monitoring event. This increase may have caused the increased dispersal and consumption of the EVO. Groundwater levels had fallen slightly in January 2018 but rose very slightly in July 2018 and remained at approximately this same level in January 2019. These higher groundwater levels likely facilitated the fast dispersal of the EHC-L. The data suggest that the EHC-L injected in November 2018 has dispersed well and enhanced anaerobic conditions and biodegradation throughout the treatment area.

In July 2019, groundwater levels had followed by approximately 1 foot when compared to the January 2019 water level data. This fall in groundwater levels may have contributed to the large decrease in CVOC concentrations observed in some of the wells, notably MW-2, MW-3, RW-5, PZ-1, and PZ-2R.

Well MW-11B is screened at a much deeper interval than the interval that was treated and is separated from the treatment zone by an existing layer of Kaolin. The data showed that effects of the injections were not observed at well MW-11B as anticipated. Wells PZ-1 and PZ-2R are located off Site, outside of the treatment

area. The data show that some effects of the injections have been observed in these locations, and, it is possible that the injected carbon may be carried downgradient and may be starting to affect these wells.

4. Observations

i) The April 2016 EVO injections resulted in decreases in the concentrations of PCE and TCE at wells MW-2, MW-3, RW-1, RW-2, RW-3, RW-4, and PZ-2R. Increases in the concentrations of cis-1,2-DCE were observed in some of these wells. In July 2017, some rebound was observed in well MW-1, and in January 2018, rebound was observed in wells MW-1, RW-1, and RW-2.

ii) The November 2018 injection of EHC-L resulted in a reduction in CVOC concentrations in the areas of wells MW-1, MW-2, MW-3, RW-1, RW-2, RW-3, RW-4, RW-5, and possibly PZ-1 and PZ-2. The rebound observed prior to the injections has been reversed in most wells. Some increased concentrations of daughter products cis-1,2-DCE and vinyl chloride were observed; however, in most wells, these concentrations appear to be decreasing.

iii) Anaerobic conditions have established throughout most of the treatment area with less anaerobic conditions present in the areas of off-Site wells PZ-1 and PZ-2R. Anaerobic conditions appeared to develop more slowly at well RW-5, suggesting that the injected arrived in this area later than it reached some of the other wells.

iv) pH values remain in the neutral range through most of the Site.

v) Increased concentrations of iron were observed at the Site after the EHC-L injection in the areas of all wells except off-Site wells PZ-1 and PZ-2R. EHC-L contains soluble iron, therefore, these data indicate that EHC-L has dispersed throughout most of the Site.

vi) Low levels of metabolic acids were detected at off-Site wells PZ-1 and PZ-2R. These data indicate that the injected carbon may be moving downgradient, and further reductions in CVOC concentrations may occur at these wells.

vii) DHC were not observed in any of the wells sampled.

5. Recommendations

The data suggests that the EHC-L reagent has dispersed throughout most of the Site and has enhanced anaerobic conditions and stimulated the biodegradation of CVOCs. PCE and TCE are no longer present within the treatment area at the Site and only daughter products cis-1,2-DCE and vinyl chloride remain above MCLs. The only wells not immediately impacted by the injections are wells PZ-1 and PZ-2R, and these wells are located off Site outside of the injection area; however, the data suggest that some of the injected material may now be making contact with these wells. The increased dispersal observed after the November 2018 injection event compared with the April 2016 injection event may be partly due to the more aqueous nature of EHC-L injected in 2018 compared to the EVO injected in 2016 but is likely largely due to the higher water levels present at the Site in 2018 compared with 2016. Degradation appears to be proceeding; however, TOC concentrations have decreased in most wells; therefore, although increased

reductions in CVOC concentrations, particularly in concentrations of daughter products, are expected to continue in the short term, an additional injection may be required in 2020. The absence of DHC bacteria in the wells sampled suggests that degradation may stall. In most of the wells, cis-1,2-DCE and sometimes low levels of vinyl chloride are the only CVOC remaining, and based on the microbial data, these compounds may be slow to degrade. The presence of ethene observed in January 2019 suggested that complete dechlorination was occurring at the Site; however, it is possible that it was a result of abiotic dechlorination mediated by iron present in the EHC-L. Bioaugmentation should be considered as part of the next injection event; however, the next injection event should not occur until groundwater levels have increased.

Appendix E
EPA Johnson and Ettinger Soil Vapor Intrusion Modeling Results

Table of Inputs and Outputs for Multiple Chemicals

Note: Parameters other than the chemical concentration must be entered in the MODEL sheet and must be the same for all chemicals. Warnings and errors are displayed in only on the MODEL sheet.

Source Characteristics:	Units	Symbol	Value	Value
			Dichloroethylene, 1,2-cis-	Vinyl Chloride
Source medium		Source	Groundwater	Groundwater
Groundwater concentration	(ug/L)	Cmedium	527	1.3
Depth below grade to water table	(m)	Ls	7.90	7.90
Average groundwater temperature	(°C)	Ts	26.06	26.06
Calc: Source vapor concentration	(ug/m3)	Cs	91640	1516
Calc: % of pure component saturated vapor concentration	(%)	%Sat	0.009%	0.000%
Chemical:	**Units**	**Symbol**	**Value**	**Value**
Chemical Name		Chem	Dichloroethylene, 1,2-cis-	Vinyl Chloride
CAS No.		CAS	156-59-2	75-01-4
Toxicity Factors				
Unit risk factor	$(ug/m^3)^{-1}$	IUR	Not Available	4.40E-06
Mutagenic compound		Mut	No	VC
Reference concentration	(ug/m^3)	RfC	3.50E+00	1.00E-01
Chemical Properties:	**Units**	**Symbol**	**Value**	**Value**
Pure component water solubility	(mg/L)	S	6.41E+03	8.80E+03
Henry's Law Constant @ 25°C	$(atm\text{-}m^3/mol)$	Hc	4.08E-03	2.78E-02
Calc: Henry's Law Constant @ 25°C	(dimensionless)	Hr	1.67E-01	1.14E+00
Calc: Henry's Law Constant @ system temperature	(dimensionless)	Hs	1.74E-01	1.17E+00
Diffusivity in air	(cm2/s)	Dair	8.84E-02	1.07E-01
Diffusivity in water	(cm2/s)	Dwater	1.13E-05	1.20E-05
Building Characteristics:	**Units**	**Symbol**	**Value**	**Value**
Building setting		Bldg_Setting	Commercial	Commercial
Foundation type		Found_Type	Slab-on-grade	Slab-on-grade
Depth below grade to base of foundation	(m)	Lb	0.20	0.20
Foundation thickness	(m)	Lf	0.20	0.20
Fraction of foundation area with cracks	(-)	eta	0.001	0.001
Enclosed space floor area	(m2)	Ab	548.64	548.64
Enclosed space mixing height	(m)	Hb	3.00	3.00
Indoor air exchange rate	(1/hr)	ach	1.50	1.50
Qsoil/Qbuilding	(-)	Qsoil_Qb	0.0030	0.0030
Calc: Building ventilation rate	(m3/hr)	Qb	2468.88	2468.88
Calc: Average vapor flow rate into building	(m3/hr)	Qsoil	7.41	7.41

Vadose zone characteristics:	Units	Symbol	Value	Value
Stratum A (Top of soil profile):				
Stratum A SCS soil type		SCS_A	Clay Loam	Clay Loam
Stratum A thickness (from surface)	(m)	hSA	4.57	4.57
Stratum A total porosity	(-)	nSA	0.442	0.442
Stratum A water-filled porosity	(-)	nwSA	0.168	0.168
Stratum A bulk density	(g/cm^3)	rhoSA	1.480	1.480
Stratum B (Soil layer below Stratum A):				
Stratum B SCS soil type		SCS_B	Loam	Loam
Stratum B thickness	(m)	hSB	2.13	2.13
Stratum B total porosity	(-)	nSB	0.399	0.399
Stratum B water-filled porosity	(-)	nwSB	0.148	0.148
Stratum B bulk density	(g/cm^3)	rhoSB	1.590	1.590
Stratum C (Soil layer below Stratum B):				
Stratum C SCS soil type		SCS_C	Sand	Sand
Stratum C thickness	(m)	hSC	1.20	1.20
Stratum C total porosity	(-)	nSC	0.375	0.375
Stratum C water-filled porosity	(-)	nwSC	0.054	0.054
Stratum C bulk density	(g/cm^3)	rhoSC	1.660	1.660
Stratum directly above the water table				
Stratum A, B, or C		src_soil	Stratum C	Stratum C
Height of capillary fringe	(m)	hcz	0.170	0.170
Capillary zone total porosity	(-)	ncz	0.375	0.375
Capillary zone water filled porosity	(-)	nwcz	0.253	0.253
Exposure Parameters:	**Units**	**Symbol**	**Value**	**Value**
Target risk for carcinogens	(-)	Target_CR	1.00E-06	1.00E-06
Target hazard quotient for non-carcinogens	(-)	Target_HQ	1	1
Exposure Scenario		Scenario	Commercial	Commercial
Averaging time for carcinogens	(yrs)	ATc	70	70
Averaging time for non-carcinogens	(yrs)	ATnc	25	25
Exposure duration	(yrs)	ED	25	25
Exposure frequency	(days/yr)	EF	250	250
Exposure time	(hrs/24 hrs)	ET	8	8
Mutagenic mode-of-action factor	(yrs)	MMOAF	72	72

Source to Indoor Air Attenuation Factor	Units	Symbol	Value	Value
Groundwater to indoor air attenuation coefficient	**(-)**	**alpha**	**5.5E-05**	**6.6E-05**
		Range	3.6E-05 - 5.6E-05	4.0E-05 - 6.8E-05

Predicted Indoor Air Concentration			Value	Value
Indoor air concentration due to vapor intrusion	**(ug/m3)**	**Cia**	**5.1E+00**	**1.0E-01**
		Range	3.3E+00 - 5.1E+00	6.1E-02 - 1.0E-01
	(ppbv)	**Cia**	**1.3E+00**	**3.9E-02**
		Range	8.3E-01 - 1.3E+00	2.4E-02 - 4.0E-02
Predicted Vapor Concentration Beneath the Foundation			**Value**	**Value**
Subslab vapor concentration	**(ug/m3)**	**Css**	**1.7E+03**	**3.4E+01**
		Range	1.0E+02 - 3.3E+04	2.1E+00 - 6.1E+02
	(ppbv)	**Css**	**4.2E+02**	**1.3E+01**
		Range	2.6E+01 - 8.3E+03	8.1E-01 - 2.4E+02
Diffusive Transport Upward Through Vadose Zone			**Value**	**Value**
Effective diffusion coefficient through Stratum A	(cm2/sec)	DeffA	6.1E-03	7.4E-03
Effective diffusion coefficient through Stratum B	(cm2/sec)	DeffB	5.6E-03	6.7E-03
Effective diffusion coefficient through Stratum C	(cm2/sec)	DeffC	1.4E-02	1.7E-02
Effective diffusion coefficient through capillary zone	(cm2/sec)	DeffCZ	5.7E-04	6.9E-04
Effective diffusion coefficient through unsaturated zone	(cm2/sec)	DeffT	5.2E-03	6.3E-03
Critical Parameters			**Value**	**Value**
α for diffusive transport from source to building with	(-)	A_Param	5.6E-05	6.8E-05
Pe (Peclet Number) for transport through the foundation	(-)	B_Param	1.2E+03	9.9E+02
α for convective transport from subslab to building	(-)	C_Param	3.0E-03	3.0E-03

Interpretation

Advection is the domina	Advection is the dominant mechanism across the foundation
Diffusion through soil is th	Diffusion through soil is the overall rate limiting process.

Critical Parameters

Hb, Ls, DeffT, ach	Hb, Ls, DeffT, ach

Non-Critical Parameters

Qsoil_Qb, Lf, DeffA, eta	Qsoil_Qb, Lf, DeffA, eta

Risk Calculations	Units	Symbol	Value	Value
Risk-Based Target Screening Levels				
Target risk for carcinogens	(-)	Target_CR	1E-06	1E-06
Target hazard quotient for noncarcinogens	(-)	Target_HQ	1	1
Target indoor air concentration	**(ug/m3)**	**Target_IA**	**1.53E+04**	**2.10E-01**
	(ppbv)	**Target_IA**	**3.87E+03**	**8.22E-02**
Target groundwater concentration	**(ug/L)**	**Target_GW**	**1.60E+06**	**2.71E+00**
Incremental Risk Estimates				
Incremental cancer risk from vapor intrusion	**(-)**	**Cancer_Risk**	**No IUR**	**3.61E-08**
		Range	-	2.2E-08 - 3.7E-08
Hazard quotient from vapor intrusion	**(-)**	**HQ**	**0.000329603**	**0.000229963**
		Range	2.2E-04 - 3.4E-04	1.4E-04 - 2.3E-04

Table of Inputs and Outputs for Multiple Chemicals

Note: Parameters other than the chemical concentration must be entered in the MODEL sheet and must be the same for all chemicals. Warnings and errors are displayed in only on the MODEL sheet.

Source Characteristics:	Units	Symbol	Dichloroethylene, 1,2-cis- Value	Tetrachloroethylene Value	Trichloroethylene Value	Vinyl Chloride Value
Source medium		Source	Groundwater	Groundwater	Groundwater	Groundwater
Groundwater concentration	(ug/L)	Cmedium	668	2.5	2.2	5.9
Depth below grade to water table	(m)	Ls	8.23	8.23	8.23	8.23
Average groundwater temperature	(°C)	Ts	24.64	24.64	24.64	24.64
Calc: Source vapor concentration	(ug/m3)	Cs	109892	1777	872	6650
Calc: % of pure component saturated vapor concentration	(%)	%Sat	0.011%	0.001%	0.000%	0.000%
Chemical:	**Units**	**Symbol**	**Value**	**Value**	**Value**	**Value**
Chemical Name		Chem	Dichloroethylene, 1,2-cis-	Tetrachloroethylene	Trichloroethylene	Vinyl Chloride
CAS No.		CAS	156-59-2	127-18-4	79-01-6	75-01-4
Toxicity Factors						
Unit risk factor	$(ug/m^3)^{-1}$	IUR	Not Available	2.60E-07	see note	4.40E-06
Mutagenic compound		Mut	No	No	Yes	VC
Reference concentration	(ug/m^3)	RfC	3.50E+00	4.00E-02	2.00E-03	1.00E-01
Chemical Properties:	**Units**	**Symbol**	**Value**	**Value**	**Value**	**Value**
Pure component water solubility	(mg/L)	S	6.41E+03	2.06E+02	1.28E+03	8.80E+03
Henry's Law Constant @ 25°C	$(atm\text{-}m^3/mol)$	Hc	4.08E-03	1.77E-02	9.85E-03	2.78E-02
Calc: Henry's Law Constant @ 25°C	(dimensionless)	Hr	1.67E-01	7.24E-01	4.03E-01	1.14E+00
Calc: Henry's Law Constant @ system temperature	(dimensionless)	Hs	1.65E-01	7.11E-01	3.96E-01	1.13E+00
Diffusivity in air	(cm2/s)	Dair	8.84E-02	5.05E-02	6.87E-02	1.07E-01
Diffusivity in water	(cm2/s)	Dwater	1.13E-05	9.46E-06	1.02E-05	1.20E-05
Building Characteristics:	**Units**	**Symbol**	**Value**	**Value**	**Value**	**Value**
Building setting		Bldg_Setting	Commercial	Commercial	Commercial	Commercial
Foundation type		Found_Type	Slab-on-grade	Slab-on-grade	Slab-on-grade	Slab-on-grade
Depth below grade to base of foundation	(m)	Lb	0.20	0.20	0.20	0.20
Foundation thickness	(m)	Lf	0.20	0.20	0.20	0.20
Fraction of foundation area with cracks	(-)	eta	0.001	0.001	0.001	0.001
Enclosed space floor area	(m2)	Ab	548.64	548.64	548.64	548.64
Enclosed space mixing height	(m)	Hb	3.00	3.00	3.00	3.00
Indoor air exchange rate	(1/hr)	ach	1.50	1.50	1.50	1.50
Qsoil/Qbuilding	(-)	Qsoil_Qb	0.0030	0.0030	0.0030	0.0030
Calc: Building ventilation rate	(m3/hr)	Qb	2468.88	2468.88	2468.88	2468.88
Calc: Average vapor flow rate into building	(m3/hr)	Qsoil	7.41	7.41	7.41	7.41

Vadose zone characteristics:	Units	Symbol	Value	Value	Value	Value
Stratum A (Top of soil profile):						
Stratum A SCS soil type		SCS_A	Clay Loam	Clay Loam	Clay Loam	Clay Loam
Stratum A thickness (from surface)	(m)	hSA	4.57	4.57	4.57	4.57
Stratum A total porosity	(-)	nSA	0.442	0.442	0.442	0.442
Stratum A water-filled porosity	(-)	nwSA	0.168	0.168	0.168	0.168
Stratum A bulk density	(g/cm^3)	rhoSA	1.480	1.480	1.480	1.480
Stratum B (Soil layer below Stratum A):						
Stratum B SCS soil type		SCS_B	Loam	Loam	Loam	Loam
Stratum B thickness	(m)	hSB	2.13	2.13	2.13	2.13
Stratum B total porosity	(-)	nSB	0.399	0.399	0.399	0.399
Stratum B water-filled porosity	(-)	nwSB	0.148	0.148	0.148	0.148
Stratum B bulk density	(g/cm^3)	rhoSB	1.590	1.590	1.590	1.590
Stratum C (Soil layer below Stratum B):						
Stratum C SCS soil type		SCS_C	Sand	Sand	Sand	Sand
Stratum C thickness	(m)	hSC	1.53	1.53	1.53	1.53
Stratum C total porosity	(-)	nSC	0.375	0.375	0.375	0.375
Stratum C water-filled porosity	(-)	nwSC	0.054	0.054	0.054	0.054
Stratum C bulk density	(g/cm^3)	rhoSC	1.660	1.660	1.660	1.660
Stratum directly above the water table						
Stratum A, B, or C		src_soil	Stratum C	Stratum C	Stratum C	Stratum C
Height of capillary fringe	(m)	hcz	0.170	0.170	0.170	0.170
Capillary zone total porosity	(-)	ncz	0.375	0.375	0.375	0.375
Capillary zone water filled porosity	(-)	nwcz	0.253	0.253	0.253	0.253
Exposure Parameters:	**Units**	**Symbol**	**Value**	**Value**	**Value**	**Value**
Target risk for carcinogens	(-)	Target_CR	1.00E-06	1.00E-06	1.00E-06	1.00E-06
Target hazard quotient for non-carcinogens	(-)	Target_HQ	1	1	1	1
Exposure Scenario		Scenario	Commercial	Commercial	Commercial	Commercial
Averaging time for carcinogens	(yrs)	ATc	70	70	70	70
Averaging time for non-carcinogens	(yrs)	ATnc	25	25	25	25
Exposure duration	(yrs)	ED	25	25	25	25
Exposure frequency	(days/yr)	EF	250	250	250	250
Exposure time	(hrs/24 hrs)	ET	8	8	8	8
Mutagenic mode-of-action factor	(yrs)	MMOAF	72	72	72	72

Source to Indoor Air Attenuation Factor	Units	Symbol	Value	Value	Value	Value
Groundwater to indoor air attenuation coefficient	**(-)**	**alpha**	**5.4E-05**	**3.1E-05**	**4.2E-05**	**6.5E-05**
		Range	3.6E-05 - 5.5E-05	2.4E-05 - 3.2E-05	3.0E-05 - 4.3E-05	4.0E-05 - 6.7E-05

Predicted Indoor Air Concentration			Value	Value	Value	Value
Indoor air concentration due to vapor intrusion	**(ug/m3)**	**Cia**	**6.0E+00**	**5.5E-02**	**3.7E-02**	**4.4E-01**
		Range	3.9E+00 - 6.1E+00	4.3E-02 - 5.6E-02	2.6E-02 - 3.7E-02	2.7E-01 - 4.4E-01
	(ppbv)	**Cia**	**1.5E+00**	**8.2E-03**	**6.9E-03**	**1.7E-01**
		Range	9.9E-01 - 1.5E+00	6.3E-03 - 8.3E-03	4.9E-03 - 7.0E-03	1.0E-01 - 1.7E-01
Predicted Vapor Concentration Beneath the Foundation			**Value**	**Value**	**Value**	**Value**
Subslab vapor concentration	**(ug/m3)**	**Css**	**2.0E+03**	**1.8E+01**	**1.2E+01**	**1.5E+02**
		Range	1.2E+02 - 3.9E+04	1.1E+00 - 4.3E+02	7.5E-01 - 2.6E+02	8.9E+00 - 2.7E+03
	(ppbv)	**Css**	**5.0E+02**	**2.7E+00**	**2.3E+00**	**5.7E+01**
		Range	3.1E+01 - 9.9E+03	1.7E-01 - 6.3E+01	1.4E-01 - 4.9E+01	3.5E+00 - 1.0E+03
Diffusive Transport Upward Through Vadose Zone			**Value**	**Value**	**Value**	**Value**
Effective diffusion coefficient through Stratum A	(cm2/sec)	DeffA	6.1E-03	3.5E-03	4.7E-03	7.4E-03
Effective diffusion coefficient through Stratum B	(cm2/sec)	DeffB	5.6E-03	3.2E-03	4.3E-03	6.7E-03
Effective diffusion coefficient through Stratum C	(cm2/sec)	DeffC	1.4E-02	8.2E-03	1.1E-02	1.7E-02
Effective diffusion coefficient through capillary zone	(cm2/sec)	DeffCZ	5.7E-04	3.2E-04	4.4E-04	6.9E-04
Effective diffusion coefficient through unsaturated zone	(cm2/sec)	DeffT	5.4E-03	3.1E-03	4.2E-03	6.5E-03
Critical Parameters			**Value**	**Value**	**Value**	**Value**
α for diffusive transport from source to building with	(-)	A_Param	5.5E-05	3.2E-05	4.3E-05	6.7E-05
Pe (Peclet Number) for transport through the foundation	(-)	B_Param	1.2E+03	2.1E+03	1.5E+03	9.9E+02
α for convective transport from subslab to building	(-)	C_Param	3.0E-03	3.0E-03	3.0E-03	3.0E-03
Interpretation						
			Advection is the domina	Advection is the domir	Advection is the domi	Advection is the domir
			Diffusion through soil is th	Diffusion through soil is	Diffusion through soil is	Diffusion through soil is
Critical Parameters						
			Hb, Ls, DeffT, ach	Hb, Ls, DeffT, ach	Hb, Ls, DeffT, ach	Hb, Ls, DeffT, ach
Non-Critical Parameters						
			Qsoil_Qb, Lf, DeffA, eta	Qsoil_Qb, Lf, DeffA, etc	Qsoil_Qb, Lf, DeffA, etc	Qsoil_Qb, Lf, DeffA, etc

Risk Calculations	Units	Symbol	Value	Value	Value	Value
Risk-Based Target Screening Levels						
Target risk for carcinogens	(-)	Target_CR	1E-06	1E-06	1E-06	1E-06
Target hazard quotient for noncarcinogens	(-)	Target_HQ	1	1	1	1
Target indoor air concentration	**(ug/m3)**	**Target_IA**	**1.53E+04**	**4.72E+01**	**2.05E+00**	**2.10E-01**
	(ppbv)	**Target_IA**	**3.87E+03**	**6.96E+00**	**3.82E-01**	**8.22E-02**
Target groundwater concentration	**(ug/L)**	**Target_GW**	**1.72E+06**	**2.13E+03**	**1.22E+02**	**2.85E+00**
Incremental Risk Estimates						
Incremental cancer risk from vapor intrusion	**(-)**	**Cancer_Risk**	**No IUR**	**1.18E-09**	**4.79E-08**	**1.56E-07**
		Range	-	9.0E-10 - 1.2E-09	3.4E-08 - 4.9E-08	9.6E-08 - 1.6E-07
Hazard quotient from vapor intrusion	**(-)**	**HQ**	**0.000389301**	**0.000316568**	**0.004212697**	**0.000993616**
		Range	2.6E-04 - 4.0E-04	2.4E-04 - 3.2E-04	3.0E-03 - 4.3E-03	6.1E-04 - 1.0E-03

about GHD

GHD is one of the world's leading professional services companies operating in the global markets of water, energy and resources, environment, property and buildings, and transportation. We provide engineering, environmental, and construction services to private and public sector clients.

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